

EVERYMAN'S ENCYCLOPAEDIA

IN TWELVE VOLUMES
VOLUME FIVE



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ABBREVIATIONS

The titles of subjects, which are printed first in bold type, have been abbreviated within each article to the initial letter or letters.

ac., acre(s).
agric., agricultural.
ambas., ambassador(s).
Amer., American.
anct., ancient.
ann., annual.
arron., arrondissement.
A.-S., Anglo-Saxon.
A.V., Authorised Version.
b., born.
Biog. Dic., Biographical Dictionary.
bor., borough.
bp., birthplace.
Brit., British.
c., about.
C., Centigrade.
cap., capital.
cent., century (7th cent.).
chem., chemistry.
co., county.
com., commune.
cub. ft., cubic feet.
d., died.
Dan., Danish.
dept., department.
dimin., diminutive.
dist., district.
div., division.
E., east; eastern.
eccles., ecclesiastical.
ed., edition; edited.
educ., educated.
e.g., example.
Ency. Brit., *Encyclopædia Britannica*.
Eng., English.
estab., established; establishment.
fl., flourished.
Flem., Flemish.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
Gk., Greek.
gov., government.
Heb., Hebrew.
hist., history.
horticult., horticultural.
h.p., horse-power.
H.Q., headquarters.
hr(s)., hour(s).
in., inch(es).
inhab., inhabitant(s).
is., island(s).
It., Italian.
Jap., Japanese.
jour., journal.
Lat., Latin.

lat., latitude.
lb., pound(s).
l. b., left bank.
long., longitude.
m., mile(s).
manuf., manufacture.
M.E., Middle English.
min., minute(s).
Mod. E., Modern English.
m.p.h., miles per hour.
mrkt tn., market town.
MS., MSS., manuscript(s).
mt, mts., mount, mountain(s).
N., north; northern.
N.T., New Testament.
O.E., Old English.
O.F., Old French.
O.T., Old Testament.
oz., ounce(s).
par., parish.
parl., parliamentary.
pop., population.
prin., principal.
prof., professor.
prov., province; provincial.
pub., published; publication.
R., river.
R.A.F., Royal Air Force.
Bank, bank.
rep., republic.
Rep. of Ireland, Eire.
R.N., Royal Navy.
Rom., Roman.
r.p.m., revolutions per minute.
R.V., Revised Version.
S., south; southern.
sec., second(s).
sev., several.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
temp., temperature.
ter., territory.
tn., town.
trans., translated, translation.
trib., tributary.
U.K., United Kingdom.
U.N., United Nations.
univ., university.
U.N.O., United Nations Organisation.
urb., urban.
U.S.A., United States of America.
vil., village.
vol., volume.
W., west; western.
Wm., William.
yd(s)., yard(s).

E

Enabling Act, see CHURCH ASSEMBLY.

Enamel is, in the strict sense, the vitreous glaze or glazes fused on the surface of metallic objects and is a general term applied to objects decorated in this way. E., a soft glass, is a compound of sand or flint, soda potash, and red lead, which when melted produce a colourless, clear material called flux. While in a state of fusion, oxides of metals are added

Konklia, Cyprus, which have true *cloisonné* enamelling, i.e. E. fused in cells formed by thin metal strips bent to the outline of the pattern and soldered to the metal base. Outside Mycenaean and Gk art, the most ancient examples are bronze ornaments of the 9th cent. BC from a cemetery at Koban in the Caucasus. From the 3rd cent. BC Celtic craftsmen substituted red E. for coral, as on the



British Museum

AN ENAMEL PANEL SHOWING ST ANTHONY AND THE ARCHER, BY
LEONARD LIMOUSIN, 1536

The arms shown are those of Jean de Langeac, Bishop of Limoges, 1532-41.

to colour it, which stain the flux throughout its mass. The E., after being stirred, is poured on to a slab in cakes of about 5 in. in diameter. E. is made in varying degrees of hardness, and the harder the E. the greater the heat required to fuse it and the greater the durability. The cakes of E. are broken up and ground to powder in a mortar, washed, and spread on the metal. The object is then placed in a furnace until the powdered E. fuses with its metal base.

History.—It is not known when E.s were first made, for as yet none has been found belonging to the time of the Assyrians or Phoenicians. The earliest examples are 6 gold rings, found in a Mycenaean tomb of the 13th cent. BC at

Witham Shield (now in the Brit. Museum), where is used the technique of *champlevé* enamelling, i.e. E. fused in troughs or cells cut out in the metal baseplate. E.s were made in the N. provs. of the Rom. empire and re-appear in the 6th cent. AD in A.-S. England, e.g. in the Sutton Hoo Ship Burial (now in the Brit. Museum). The great revival of *cloisonné* E. commenced in Constantinople in the 10th cent. AD. The masterpiece of this Byzantine E. is the Pala d'Oro in St Mark's, Venice. In the 12th cent. a new style in the *champlevé* technique was begun in the valleys of the Rhine and Meuse, at Limoges in France and also in N. Spain. The undoubted masterpiece of this period is the pulpit at Klosterneuberg,

near Vienna, by Nicholas of Verdun (fl. 1181-1205). In the late 13th cent. a new method of E. was discovered in Italy, known as '*basse-taille*,' i.e. a coloured translucent E. fused over a design engraved in low relief below the level of the surrounding metal so that after firing the E. is flush with surrounding metal area. The outstanding example of this technique is the Royal Gold Cup of the kings of France and England (in the Brit. Museum) made in Paris about 1380. A late medieval development was the *plique-à-jour* E., in which the translucent E. is fused in an openwork cloisonné frame, like a stained-glass window. At the same time, enamelling the surface of objects in the round was introduced, particularly for jewellery. In the 15th cent., in N. Italy and at Limoges, '*painted enamels*' were first made, i.e. coloured E. applied by brush, spatula, or point over a design scratched in outline on the metal base-plate. The most famous craftsmen of this method were Nardon Penicaud (1474-1539), Pierre Raymond, Leonard Limousin, and Jean Penicaud. By the 17th cent. this style of E. had declined and was eclipsed by the *miniature painted* E.s, especially those of the Toutin family in Paris. However, in these E.s and the Battersea transfer-printed E.s the colours are not E.s but are applied after the E. is fired and fused, and are therefore not properly speaking within the category of E.s. See E. Molnir, *Dictionnaire des Émailleurs*, 1885; Otto von Falke, *Deutsche Schmelzarbeiten des Mittelalters*, 1904; J. J. Marguet de Vasselot, *Émaux Limousins, XVe siècle*, 1921; M. Chamot, *English Medieval Enamels*, 1930; W. L. Hildburgh, *Medieval Spanish Enamels*, 1936; J. J. Marguet de Vasselot, *Les Croixes Limousines*, 1941; L. Falize, *Claudius Popelin et la renaissance des émaux peints*; M. S. Gautier, *Émaux Limousins*, 1950; J. J. Marguet de Vasselot, *Les Gemellions Limousins*, 1952; Paul Thoby, *Les Croix Limousines*, 1953; H. Maryon, *Metawork and Enamelling*, 1954.

Enaré, see INARI.

Encenia, see COMMEMORATION.

Encarnación, cap. of Itapúa dept. important commercial tn at the terminus of the Central Railway, Paraguay. Products include tobacco, cotton, rice, cattle, and timber. A train ferry connects E. with Posadas (q.v.), in NE. Argentina.

Encaustic Painting. This term is employed to describe a picture painted by means of heated wax. It is an ancient method of painting, and the final process consisted of an application of heated wax to the picture. This process is now practically obsolete, but some people consider that neither oil nor fresco paintings are so permanent as the E., which is unfortunately one of the lost arts. Emma J. Greenland, at the close of the 18th cent., did indeed make some experiments in the endeavour to ascertain the ancient methods, but they met with but poor success, the tint and texture being neither so brilliant

nor durable as oil painting. We have no important examples of classic Gk E. P., but some interesting Egyptian remains of the kind were brought to light at the Oasis of Fayum in 1888. The National Gallery has a series of these Greco-Rom. portraits from mummy-cases, painted in E., c. AD 40-250.

Encecladus, one of the 100-armed giants who revolted against Zeus. As he fled to Sicily he was transfixed by a thunderbolt and buried under Etna.

Encephalitis, inflammation of the brain. E. is sometimes associated with infantile paralysis (q.v.) and also, but more rarely, with any of the virus infections (*see under* CHICKEN-POX and MUMPS). It may also occur after vaccination (q.v.) when this is performed for the first time other than in infancy. It sometimes causes changes in personality and behaviour. *E. lethargica* or *Epidemic E.* (sleepy sickness) is a virus disease which sometimes occurs in epidemic form. The first noted epidemic occurred in Vienna in 1917 and was followed by an outbreak in Great Britain in 1918. The symptoms of the acute stage of the disease vary widely according to the part of the brain most affected and the severity of the infection. Most commonly there is fever, lethargy (or wakefulness at night and drowsiness in the day), muscular rigidity, and paralysis of the eye muscles causing double vision. The acute phase may last a few days or several weeks and complete recovery may ensue. Some cases do not completely recover, while others pass into a chronic stage of muscular rigidity and tremor characterised by a mechanical shuffling gait and an immobile, expressionless face. This condition, known as *paralysis agitans* or *Parkinsonism* (q.v.), is also seen in certain senile cerebral degenerative changes. *E. lethargica* must not be confused with *sleeping sickness* (q.v.), a tropical disease caused by the trypanosome parasite.

Encephalocele, a protrusion of a portion of the brain substance through an opening in the skull. It is most commonly a congenital condition.

Encephalon, or Brain (q.v.), is that enlarged upper portion of the cerebrospinal axis contained in the cranium. *See* BRAIN.

Enchantment, *see* FAIRIES; INCANTATION; MAGIC.

Encina (or *Enzina*), Juan del (1468-c. 1529), Sp. poet and founder of the secular drama in Spain, b. Salamanca, and studied under the great Sp. humanist Nebrija. He entered the Church, and became prior of León. He began writing poetry at a very early age, and *Cancionero*, a collection of odes, lyrics, and dramatic pieces, was printed at Salamanca in 1496. In 1519 he made a pilgrimage to Jerusalem, and wrote a poetical account of this in 1521. His fame, however, does not rest on either of these works, but on his *Representaciones*, 14 dramatic poems, partly religious, partly secular, the latter of which were acted in Spain in 1492. His most popular work, *La Farsa de Plácida y Victoriano*, was condemned by the

Inquisition and lost in 1559. E. was the first important Sp. dramatist, and had such imitators as L. Fernández and Torres Naharro.

Encke, Johann Franz (1791–1865), Ger. astronomer, studied under Gauss at Göttingen. On completing his studies there he became assistant at the observatory at Seeberg, afterwards vice-director, and in 1822 director. In 1825 he succeeded Bode as director of the Royal Observatory at Berlin. He superintended the execution of the star-maps of Berlin Academy (1830–59) and the erection of the new observatory (1832–5). He is most famous for his discussion of the orbit of the comet discovered by Pons, 26 Nov. 1818. It has since been known as E.'s comet, and has the shortest known period of about 3½ years. E. also wrote *Die Entfernung der Sonne* (2 tracts based on the transits of Venus, 1761 and 1769, 1822–4). See life by Bruhus, 1869.

Enclave, portion of a state within the boundaries of another, notably in Germany. To the proprietor state the E. is known as its 'exclave.'

Enclosures, see ALLOTMENTS; OPEN SPACES AND COMMONS.

'Encounter' monthly magazine giving an international review of literature, arts, current affairs, founded in Oct. 1953 by the co-editors, Stephen Spender and Irving Kristol, and sponsored by the Congress for Cultural Freedom. Politically a forum of debate with a marked interest in Asia, it also draws writers of original poems, stories, and criticism from all over the world.

Enkratites (Gk 'self-controlling'), a sect of Christian ascetics of the 2nd cent. at Rome and in Asia Minor. Their leader was the Gnostic Tatian, and they practised total abstinence from flesh, wine, and marriage. They substituted water for wine in the Eucharist, and were hence sometimes called *Hydroparastatae*, or *Aquarians*. They existed as late as the 4th cent., and the name came to be given to ascetic Gnostics generally.

Enorinal (Crinoidal) Limestones. This name is given to limestones which abound in the calcareous fragments of crinoids, large masses of the rock being entirely composed of the joints and fragments of their skeletons. Many cylindrical bodies may be found, some flat and coin-shaped, but more often they are elongated and perforated along their long axis by a canal. Hence in some parts these are called 'St Cuthbert's beads.' Such remains are commonest in limestones of the Silurian, Devonian, and Carboniferous ages. Large beds occur in the Hamilton and Helderberg groups in New York state, and in the mt limestones of N. England.

Enocrinites, see CRINOIDEA.

Encyclical Letters (from Lat. *encyclicus*, circular), an expression indicating in a general sense circular eccles. letters sent on some important occasions by the pope to the bishops. These letters differ from the papal bulls in that the latter generally have some more special object in view.

E. L. generally contain instructions and warnings against dangers which may threaten the Church.

Encyclopaedia, a derivative from the Gk *enkuklios paidia*, circular or complete education: it originally meant the whole group of studies which every free-born Gk youth was required to complete in preparation for active life: the liberal curriculum. The phrase was adopted by the Romans, and in both these anc. languages came to mean systematic study of, or instruction in, all the branches of learning. With this idea of encyclical education was soon associated the notion of collecting the materials of such instruction into a single work, where the contents and relations of the various arts and sciences should be systematically expounded. There were many early attempts to produce such a work, though the name E. was not used till the 16th cent. This is now its common application.

The earliest E.s were treatises or groups of connected treatises adapted for continuous study, not merely for reference, and they contained the more or less extensive accumulation of learning made by their authors individually. The first E. is said to have been compiled by Speusippus (d. 339 bc), a disciple of Plato, but of this nothing is known. Among the Romans, Marcus Terentius Varro (d. c. 27 bc) was the first encyclopaedist, but his *Disciplinarum Libri IX.*, containing treatises on grammar, rhetoric, arithmetic, etc., and another work on Rom. antiquities, have both been lost. The earliest E. we possess is the famous *Historia Naturalis* of Pliny the Elder (AD 23–79), a work on natural science, considered especially with reference to human life, and including geography, medicine, and the hist. of art. In the 5th cent. Martinus (Capella), a native of N. Africa, produced an E. of the 7 liberal arts, which was used extensively as a school text-book in the Middle Ages. A similar work was compiled by Isidore, bishop of Seville (c. 570–636), and there were one or two Gk E.s in the 12th cent. Of these early works the most important is the *Bibliotheca Mundi*, or *Speculum Maius*, or *Speculum Triplex*, of Vincent of Beauvais, a Dominican friar of the 13th cent. It was in the reign of Yung Lo (d. 1425) that the vast literary collection known to posterity as the *Great Encyclopaedia* was produced though never printed (see CHINA.—Literature). In 1541 the name cyclopaedia was first used by Ringelberg of Basel, and Paul Scalich used the term E. in 1559. The 17th cent. saw many E.s, including Alsted's 7 vols., in Lat.; the *Grand Dictionnaire Historique* of Louis Moreri, with an alphabetical arrangement; J. J. Hoffmann's *Lexicon Universale*; and, most famous of all, the *Dictionnaire Historique et Critique* of Pierre Bayle, 1697. The anct type was changing, and the E. was becoming assimilated to the dictionary. The alphabetical arrangement led to a change of purpose and character in the compilation, which became a work of reference, giving, instead of the exposition of the system of

is called 'potential' E. by way of distinction. A steam-hammer when at rest in its highest position is a good example of a system possessing 'potential' E. Again, in the vibrations of a pendulum, the E. is constantly being changed from a kinetic to a potential form and vice versa. All forms of E. can be classified under one or other of the types, kinetic or potential E. For instance, kinetic E. is present in mass motion, wave motion (sound, light, etc.), electric currents, etc.; and potential E. is recognised in raised masses, magnetised bodies, separated electric charges, etc. One characteristic of all E. is its property of transformation, and in all its transformations there is evident the principle of conservation of E. The physical law that is known by this name asserts that the total amount of E. in any isolated system is invariable in amount. E. may be added or abstracted from without, but as long as no external influences intervene the total quantity of E. within the system can neither increase nor decrease. It is usual, therefore, to say that the entire E. of the universe is conserved. Galileo seems to have been familiar with the idea that E. cannot be created, a fact which he inferred from a careful study of the machines, all of a simple nature, that were used in his day. However, there appear to be many cases in which E. is destroyed, and all mechanical E. is gradually wasted away by frictional and such-like losses, the mechanical E. being converted into heat E. The motions of the celestial bodies are far more easily described by the aid of the principles of conservation of E. than they could be without it. It is now recognised that mass can be converted into E., under certain conditions, according to the equation $E = mc^2$, where m is the mass, and c is the velocity of light. This conversion of mass into E. is the basis of atomic power. The principle of conservation of E. must now be qualified. It still holds if the mass is unchanged. Alternatively it can be replaced by a principle of conservation of mass and E., treated together. See RELATIVITY; METROLOGY.

Enez, Gk Enos, frontier vil. of Turkish Thrace at the mouth of the Maritsa. It is impossible for any but small vessels to enter the harbour owing to the silting sand. Pop. 550.

Enfantin, Barthélemy Prosper (1796-1864), son of a banker in Paris, became one of the chief founders of the Saint-Simon (q.v.) school of Socialism. From 1826 till 1830 he was associated with Bazard in carrying on H. de Saint-Simon's work, but they eventually disagreed on the question of marriage, E. being an advocate of free-love, which led to his prosecution in 1832. He was imprisoned for a year, and on his release became editor of the jour. *Le Crédit Public*. His collected works were pub. in *Œuvres de Saint-Simon et d'Enfantin*, 1865-78. See H. Castille, *Le Père Enfantin*, 1859.

Enfield: 1. Tn and par. of Middx, England, 10½ m. N. of London Bridge.

Early in its hist. it was the centre of trade for N. Middx; a market granted in 1304 was closed in 1869. Industries grew up in the 19th cent., and the Royal Ordnance Factory is at E. Lock in the NE. It is now largely a residential suburb. Elizabeth I lived at Elsynge Hall, no longer standing, before and after her accession. Charles and Mary Lamb lived at Chase Side, 1827-33. The par. church has a late 14th-cent. tower, and among its monuments is the remarkable brass of Joyce, Lady Tiptoft (d. 1446). It returns 2 members to Parliament. Pop. 110,000.

2. Tn of Connecticut, U.S.A., situated in Hartford co, on Connecticut R. It raises dairy and truck-farm products and tobacco, and manufs. hardware, carpets, paper and wood products, and woollens. Pop. 15,460.

Enfilade (Fr. from *enfiler*, to thread, to pass through from end to end), a military term used when the firing is directed along an enemy's line or parapet. It is a most effective form of fire, being extremely difficult to meet, and entrenchments or parapets are useless as cover. The usual form of defence against an E. is a *traverse*, or bank of earth raised at right angles to the lines of defence.

Enfranchisement, see COPYHOLD.

Engadine, Swiss part of the valley of the Upper Inn in the canton of the Grisons. It is traversed by a carriage road from the Malaja Plateau (5935 ft) at the SW. end to Martinsbruck (3406 ft) at the NE. end, a distance of 56 m. It is divided into the Upper and Lower E., the cap. of the former being Samaden, of the latter, Scuols. The Upper E. contains sev. lakes, and has favourite health resorts, the mineral waters of St Moritz having been known since the 16th cent. Pontresina is a centre for tourists. The valley is reached by road over the passes, and there is an electric railway running under the Albula Pass to St Moritz and Pontresina. The Alpine flora is very rich and varied. The Swiss National Park, an area of 54 sq. m., is in the Lower E. The language spoken is Ladin (an old Romansch tongue) or German-Swiss. Pop. 15,000.

Engelberg, beautifully situated vil. in the half-canton of Obwalden, Switzerland, the terminus of the electric railway from Stansstad on Lake Luzern; a favourite summer resort, and one of the most popular winter sports centres in Switzerland. It is 3345 ft high, and shut in on all sides by high mts. The Benedictine abbey, still surviving, was founded in 1120 and the whole valley ruled by the abbot until 1798. Pop. 2500.

Engels, Friedrich (1820-95), Ger. Socialist, b. Barmen, the son of a wealthy cotton-spinner. After spending 2 years in England writing for the organs of the Owenite and Chartist movements, he went to Paris and there visited Karl Marx (q.v.). The two became close friends and worked so much together during the remainder of their lives that the works of the one became more or less the works of the other. E. wrote in collaboration with Marx *Die heilige Familie oder Kritik der*

Engel's

kritischen Kritik, 1845, and *Manifest der kommunistischen Partei*, the famous Communist manifesto (London, 1848; Eng. eds. 1848 and 1888). After the death of his friend he pub. the 3rd and last vol. of Marx's work, *Das Kapital*, 1885. See F. Mehring, *Aus dem Literarischen Nachlass von Karl Marx, Friedrich Engels, und Ferdinand Lassalle*, 1902; O. Mayer, *Friedrich Engels*, 1920; D. Ryazanoff, *Friedrich Engels and Karl Marx*, 1927; E. H. Carr, *Karl Marx*, 1934.

Engel's (until 1930's **Pokrovsk**), tn on the Volga, opposite Saratov, in Saratov Oblast. It has engineering, textile, and meat-packing industries. It was founded by Ukrainian Cossacks: from 1922 to 1941 it was the cap., economic and cultural centre of the Volga German autonomous rep. (q.v.). Pop. (1956) 79,000. Russian and Ukrainian (until 1941 also Germans).

Enghien, Henry I and II de Bourbon, Ducs d', see CONDÉ, PRINCE DE.

Enghien, Louis Antoine Henri de Bourbon Condé, Duc d' (1772-1804). Fr. nobleman, son of Henri Louis Joseph, prince of Condé, and Louise Thérèse Mathilde, sister of the duke of Orleans (Philippe Egalité), b. at Chantilly. In 1792 he was given a command in the Fr. royal army of *émigrés*, and served in the Condé army under his father and grandfather. After the peace of Lunéville (Feb. 1801) he retired to Ettenheim in Baden, having married the niece of Cardinal de Rohan, the Princess Charlotte. In 1804 he was falsely accused of being implicated in the Cadoudal-Pichegru conspiracy, and by Napoleon's orders was seized and taken to the castle of Vincennes, where after the pretence of a trial he was shot. He was the last of the house of Condé. It was a sentence which considerably shocked educ. opinion throughout Europe, and was one of Napoleon's biggest political mistakes. See A. Maricourt, *La Mort du Duc d'Enghien*, 1930.

Enghien (Flem. Edingen), tn in the prov. of Hainaut, Belgium, situated on the Fr.-Flem. language frontier. It is famous for its lace, and was once the seat of the Condé family, the dukes of E. The castle was burnt down, but the park, laid out in the 16th cent., still remains, and contains a stone cottage built by an ancestor of the present owner, the duke of Arenberg, for Jean-Jacques Rousseau. Pop. 4400.

Enghien-les-Bains, Fr. tn in the dept of Seine-et-Oise, on the E. lake, 8 m. from Paris. It is a health resort with sulphurous waters. Pop. 11,100.

Engine, contrivance for converting heat or chemical energy into mechanical energy of (usually reciprocating) motion; the name is also used for the steam locomotive. Turbines are usually specified as such. See AERO ENGINES; INTERNAL-COMBUSTION ENGINES; STEAM ENGINES.

Engineering, in the stricter sense, the art of constructing and using engines; but, in the wider sense, including the whole range of design and construction of what may be broadly termed 'works.' In a popular classification, we may consider

Engineering

separately such branches as agric. E., automobile E., and marine E., but the orthodox classification is into the 5 divs.: civil, electrical, mechanical, mining, and chemical. For the prin. articles on E. see AERO ENGINES; ALTERNATING CURRENT; BOILER; BRIDGE; CANAL; CHEMICAL ENGINEERING; COAL MINING; CONVEYORS AND ELEVATORS; CYCLES AND CYCLING; DISTRIBUTION, ELECTRIC; DOCK; DRAINAGE; ELECTRIC MACHINES; ELECTRIC SUPPLY; FOUNDATIONS; FURNACES; GUNS; HARBOURS; MOTOR SHIPS; MINING; POWER STATIONS; PUMP; RAILWAYS; RIVER ENGINEERING; ROADS; ROCKETS AND SPACE TRAVEL; SHIPS AND SHIPBUILDING; STEAM; STEAM ENGINES; TELEGRAPHY; TELEPHONY; TELEVISION; TRANSMISSION, ELECTRIC; TUNNELING; TURBINES.

The term 'civil engineer' is used in contradistinction to that of military engineer: the work is concerned with all branches of civil construction, the design, construction, and maintenance of public works, such as docks, irrigation schemes, bridges, viaducts, roads, etc., and also what is rather vaguely called 'constructional engineering.' The directing body in Great Britain is the Institution of Civil Engineers. Electrical E. comprises the 2 classes, power and communication, and is concerned with the construction, installation, and maintenance of electrical machinery, power-stations, lighting, heating, transmission of electrical energy, and telecommunication. Practical considerations, especially of training, demand the retention of these orthodox divs., all of which have their appropriate governing body; thus the directing body of the electrical engineer is the Institution of Electrical Engineers. Mechanical E. is the most extensive branch of the profession and embraces the work of designing, constructing, and operating engines, whatever their motive-power—steam engines, gas engines, internal-combustion engines, etc. The directing body is the Institution of Mechanical Engineers. Mining E. is concerned with the building, erection, and working of apparatus for sinking mines, and geological surveying for metalliferous areas or oil-field development. The directing bodies are the Institution of Mining Engineers, the Institution of Mining and Metallurgy, and the Institute of Petroleum. Membership depends on the branch or branches of mining E. adopted. There is scope for the mining engineer both in Great Britain and overseas, in commercial companies—which in Britain generally implies coal, and sometimes iron ore, lead, and tin—as mine inspectors and surveyors under the Mines Dept, practical experience being essential.

Engineering, Military. M. E. is the adaptation of engineering practice to military requirements. As was evident in the First World War, a civilian engineer can readily take his place on the executive side of M. E., but on the administrative side military experience and training are required. A modern army must rely on

civilian resources to a very great extent, not only for manpower and material, but also for technical experts, and among the latter the military engineer is of the highest importance. The First World War gave a great impetus to scientific development, notably in chem., metallurgy, and physics, which 3 branches of scientific study have had a revolutionary effect on the military machine, e.g. in the making of poison gas, high explosives, and synthetic oil; in the application of the internal-combustion engine to aviation and tanks; and in wireless telegraphy, respectively. M. E. is directly concerned with all these developments, and in the decade before the outbreak of the Second World War the greatest problem for military engineers was 'mechanisation'; i.e. the utilisation of mechanically produced power in order to increase mobility and to conserve physical energy. The task of M. E. is to assimilate the tremendous increase of engineering knowledge into the technique of war. The co-operation of the general staff of a modern army with the military engineer is necessary to effect this process. But as the members of the general staff of a modern army are not experts in M. E., though they are responsible for policy, the modern military engineer must be able to act in a consultative capacity as well as to carry out the current and ordinary engineering work of an army. In other words, his task is to interpret the policy of the general staff in terms of the developments of science. Besides the military engineer there is the engineering specialist, whose duties are restricted to the work of research and design in military maintenance. On the extent to which the distinction between the military engineer and the specialist in design and research is preserved in departmental organisation, efficiency in M. E. will largely depend. Every new device, and every application of a new weapon, have their reactions on numerous other devices and weapons, e.g. if a more efficient anti-tank gun is produced, a faster or more highly armoured tank must replace previously existing tanks, and this, in turn, may call for progress in bridge design to carry a heavier tank. Thus, to attain all-round efficiency in an army, the fighting machines must be evolved as a co-ordinated whole; and it is in this sphere that the consultative advice of the military engineer assumes such importance. In the Brit. Army the training of military engineers is effected by the education and theoretical training of personnel of the Corps of Royal Engineers; which training comprises courses of theoretical training at Cambridge Univ. and the Royal Military College of Science, a course of applied practical training in military *matériel* at the School of Military Engineering, and experience in combatant duties by co-operation with other arms of the army through the R.E. field squadrons.

In the Second World War Brit. M.E. made a great contribution to victory on all the prin. fronts, e.g. in Italy, in 1943, if for no other reason than that in no prior

campaign had an enemy carried out demolition on such a scale and in terrain so perfectly adapted to it. In the area about the line Foggia-Naples, a region of mt gorge and riv., the Germans had blown almost every bridge and culvert, both on roads and railways, and there were entire sections of the railway along which their wrocker-train passed, uprooting and smashing every sleeper and cutting every rail. In these circumstances was used one of the great inventions of M. E., the *Bailey bridge*; standardised and adaptable to almost any load, it was the product of the Royal Engineers' Experimental Bridging School, after one of whose profs. it was named. This bridge can take loads as heavy as the largest tank on a transporter and solved the problem of bridging behind the line. The Royal Engineers were also responsible for the duty of sweeping the approaches to assault-crossings with the aid of *mine detectors*. *Bulldozers* led the tanks into battle, carving a path for them under heavy fire. In Italy the Voltorno and Garigliano presented 2 major water-obstacles, and the crossings of these rivers were carried out in successive phases—the infantry made the initial battle-crossing by assault boat, while their equipment followed by raft. The Engineers, meanwhile, worked to substitute bridges at the earliest possible moment and to pass a continuous stream of traffic. The first bridges were light, floating affairs carried on *folding boats*. These were quickly supplemented by Bailey bridges. These bridges also played a great part in the crossing of the Rhine on the Brit. section of that front in 1945. Another great M. E. achievement was the construction of a system of petrol pipe lines between the base ports and the front. The laying of these pipe lines was the work of engineer personnel from the United States, who quickly laid the pipe, installed the chain of boosting stations, and constructed the storage tanks, this latter operation involving very nice adjustment. Aerodrome work was another major task of M. E. Thus, in Italy, the Brit. Aerodrome Construction Company and the Amer. Aviation Engineers between them built some 30 airfields, mostly round Foggia. See also ENGINEERS, CORPS OF ROYAL.

Engineering Drawing is the chief medium by which the engineer conveys his ideas to others, and the drawing office is the connecting link between the engineering dept and the machine shops. The draughtsman's function is to develop the sketches drawn by the engineers into the finished drawing from which the machinist takes all his measurements. It is in the drawing office that the inventions come to life and indeed that many may reveal fatal flaws. From the pencil drawing an ink tracing is made on tracing paper or cloth; this work is done by junior draughtsmen, and in many works it is done by girls. Photo-prints are taken from these tracings, the commonest of which are the ferro-prussiate ('blue') prints or 'photostats.' Of these prints sev. are

sent to the drawing stores in the machine shops and 1 copy is put in the records. A drawing office is an excellent place for the young engineer to receive his training, for he sees designs of all the pieces of machinery from their earliest stages to completion. See J. Duncan, *An Introduction to Engineering Drawing*, 1922; A. Abbott, *Machine Drawing and Design*, 1936; A. Cryer, *Engineering Drawing*, 1939.

Engineers, Corps of Royal. Before the year 1855 the technical elements of the Brit. Army, e.g. artillery and engineers, were provided by the Board of Ordnance, Both artillery and engineers officers formed part of the early 'Artillery Trains.' The system under which artillery units were raised for a campaign was found to be inadequate and uneconomical, and as a result artillery companies (now Royal Artillery) were estab. in 1716, and the ancestor of the R. E. in 1717, both emerging from the Board of Ordnance. Before 1782 the officers of the R. E. did not have military titles, but in that year they were first granted commissions. It was not until 1787, however, that the military officers of the Engineer Dept. were constituted the 'Corps of Royal Engineers,' the men being regimented in the Corps of Royal Military Artificers. When Napoleon invaded Egypt a detachment was sent to Constantinople to train the Turkish Army, and other companies performed good service in Egypt, Malta, Italy, Sicily, and the West Indies. In 1813 the title of the Corps of Royal Sappers and Miners replaced that of Military Artificers and did effective work under Wellington during the Peninsular and Waterloo campaigns. The Crimean War was the scene of manifold activities by the engineers, and the officers and men were, immediately afterwards, united to form one corps under the title of 'Royal Engineers.' After the Indian Mutiny the Bengal, Madras, and Bombay Corps of Engineers were transferred to the R. E.

Being a scientific corps the R. E. has 'nursed' many important branches of military science, particularly the Royal Flying Corps (now the R.A.F.), which was evolved from the Air Battalion of the R. E., and the Royal Corps of Signals, which was evolved from the Signal Units of the R. E. The work of the R. E.s in any theatre of war extends from fieldworks in forward areas to the construction, operation, and maintenance of ports on which the theatre is based, and right through the intervening organisations. They construct or adapt buildings necessary for barracks, hospitals, and stores. They make tracks and roads; provide water and light, and dispose of sewage; build roads, bridges, and ferds and lay, repair, and run the railways. They make and clear airfields and landing grounds. They do the army's survey work and produce maps. They are concerned in all major camouflage; they are expert in chemical warfare and smoke; they operate their own heavy engineering workshops and electrical installations.

They do ship and barge construction and repair; they undertake minelifting and bomb disposal, and conduct the army's postal service. They are responsible for movement control. Such operations are conducted in field units, and in L. of C. units which are not fully mobile.

The widespread services of this Corps are aptly expressed in their mottoes, granted in 1832, 'Ubique' and 'Quo fas et gloria ducunt.' The Queen is Colonel-in-Chief of the Corps.

See W. Porter and others, *The History of the Corps of Royal Engineers*, 7 vols., 1889-1952.

England. Topographically, England may be viewed with Wales or as a separate unit; administratively, for purposes of local and central gov., in matters of statistics, etc., they are almost invariably treated as one. A description of the geographical features peculiar to Wales, together with a list of the Welsh cos., and an account of the prin. Welsh industries and occupations, etc., and the hist. of the principality, will be found in the article Wales (q.v.). Communications (ports and inland transport) and imports and exports are dealt with in the article Great Britain (q.v.), in which will also be found cross-references to the prin. articles covering defence, education, economics and finance, gov. and administration, hist., housing, justice and the legal system, religion, social welfare, and the arts.

POSITION AND AREA.—Of the group of is. which lie off the W. coast of Europe, and which form the U.K. of Great Britain and Ireland, England (including Wales), the most important portion in wealth, pop. size, and possessing the centre of the gov. and administration, lies between lat. 55° 46' N. at the mouth of the Tweed and lat. 49° 57' 30" N. at the Lizard and between long. 1° 46' E. at Lowestoft and 5° 43' W. at Land's End. It is separated from Scotland to the N. by a line from Berwick-on-Tweed to the head of Solway Firth; bounded on the E. by the North Sea, S. by the Eng. Channel; the Strait of Dover, 21 m. at its narrowest point, divides it from the coast of France (100 m. distant at the Lizard). At the SW. corner the broad and deeply indented Bristol Channel parts the SW. of England from Wales and opens on the Atlantic; on the W., St George's Channel divides Wales from Ireland and leads to the Irish Sea and thence to North Channel separating Ireland and Scotland. The coast-line, following broad indentations and including the Isle of Wight and the is. of Anglesey, is about 2350 m. No point in the Brit. Isles is more than 75 m. from tidal water. The total area is 58,345 sq. m., of which E. contains 50,320 and Wales (including Monmouthshire) 8016 sq. m. (including inland water). The Channel Is. and the Isle of Man (qq.v.), in the Eng. Channel and the Irish Sea respectively, are described in separate articles.

ADMINISTRATIVE DIVISIONS.—England is divided into 41 geographical (or 50 administrative) cos., as follows: Bedfordshire,

Berkshire, Buckinghamshire, Cambridgeshire, Cheshire, Cornwall, Cumberland, Derbyshire, Devon, Dorset, Durham, Essex, Gloucestershire, Hampshire, Herefordshire, Hertfordshire, Huntingdonshire, Kent, Lancashire, Leicestershire, Lincolnshire, London, Middlesex, Monmouthshire, Norfolk, Northamptonshire, Northumberland, Nottinghamshire, Oxfordshire, Rutland, Shropshire, Somerset, Staffordshire, Suffolk, Surrey, Sussex, Warwickshire, Westmorland, Wiltshire, Worcestershire, and Yorkshire (qq.v.).

GENERAL TOPOGRAPHICAL DESCRIPTION.—The is. group known as the Brit.

sion is taking place, and at Selsey Bill (Sussex) more than 34 ac. have been submerged in the past 20 years (the highest acreage lost at any point in Britain this century).

Inland, 2 marked divs. may be observed, the *Highland Zone* and the *Lowland Zone* (see also EUROPE, *Geology*). The highland zone comprises the Pennines (q.v.), running from N. to S. through N. England as far as the Midland plain (the high moorlands of the Pennines form an anticline with much picturesque scenery, particularly around the Peak (q.v.) in Derbyshire); the Lake District (q.v.) in the NW. a favourite area



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BIBURY, GLOUCESTERSHIRE: A TYPICAL ENGLISH VILLAGE

Isles lies on the continental shelf, surrounded by shallow waters. The N. Atlantic drift spreads warm water over the shelf and makes for a comparatively mild climate (see CLIMATE, below), without extremes of temp. There are many small natural harbours around the coast and since the riv. estuaries are relatively free from silting they have often provided suitable facilities for the building of ports. The Severn (210 m.) and the Thames (200 m.) are the 2 longest Eng. rivs. Coastal scenery is varied, ranging from chalk cliffs such as Shakespeare Cliff (Kent) and the Seven Sisters (Sussex), in the SE., to granite headlands in the SW. and red sandstone in Cumberland, while in East Anglia and around the Wash shingle and sand form a low-lying coastal area. On the North Sea coast, particularly between Thames and Humber, sea defences have been constructed to afford protection from incursion. In some places around the Eng. coast an. incur-

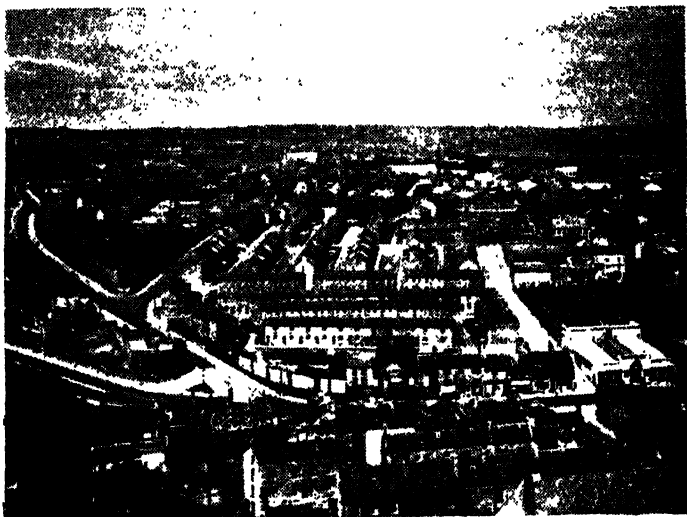
for touring, wild and beautiful, and containing Scafell Pike (q.v.), the highest Eng. peak; and the SW. peninsula (Devon and Cornwall). Considerable areas are over 1000 ft above sea-level, and large tracts of moorland occur, resulting from thin, poor soils. Cultivation is concentrated in the valleys. The lowland zone comprises the Midlands and SE., with East Anglia (q.v.) and the Fens (q.v.), which have, since the 17th cent., developed drainage systems to facilitate cultivation. From the chalk cliffs at Dover the N. Downs run in an arc across Kent and Surrey, overlooking the fertile Weald and the so-called 'Garden of England'; the S. Downs run along the S. coast through the co. of Sussex, behind the seaside resorts of the Eng. Channel (q.v.). The Midland plain forms an extensive agric. area, stretching from the Fenland cos. to Worcestershire, Warwickshire, and Gloucestershire (as far as the Bristol Channel, q.v.) and S. to the Thames Valley.

Little of this zone is as much as 1000 ft above sea-level and there is intensive cultivation of almost the whole region, industrial and urb. areas excepted.

CLIMATE.—The Eng. climate is equable. The Atlantic coasts enjoy a comparatively mild climate but may have heavy rainfall and storms (brought in from the ocean); the North Sea coast tends to be more liable to flooding. The ann. daily mean air temp. at sea-level (England and Wales) in 1955 was 49·7° F. (Aug. having a temp. of 64·8° F.); the ann. total rainfall (England

and Wales) in 1955 was 31·3 in. (heaviest in Dec. with 4·3 in.); and in England and Wales there were 4·47 mean hrs of sunshine per day in 1955 (July being the hottest month with 8·5 hrs per day). *See also* EUROPE, *Climate*.

able growing is localised, with apples mostly in Kent and Hereford, cherries mostly in Kent, plums mostly in Worcestershire, strawberries mostly in Hants, Kent, and Norfolk, rhubarb mostly in Yorks, tomatoes mostly in Essex, vegetables mostly in Kent, Yorks, and the Fens. The Channel Is., Cornwall, and the Scilly Isles grow early vegetables, and spring flowers are also grown in these areas, the Scillies being the chief suppliers for the London and other markets. The bulb-fields of the S. Lines-Isle of Ely area are



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HALIFAX, YORKSHIRE, FROM THE TOP OF THE WAINHOUSE TOWER

and Wales) in 1955 was 31·3 in. (heaviest in Dec. with 4·3 in.); and in England and Wales there were 4·47 mean hrs of sunshine per day in 1955 (July being the hottest month with 8·5 hrs per day). *See also* EUROPE, *Climate*.

RURAL ENGLAND.—Intensive farming is carried on in both England and Wales, mostly on small or medium-sized farms, the average size being about 80 ac. (*see also* AGRICULTURE; SMALLHOLDINGS); of a total of 29·8 million ac. of agric. land, 24·5 million ac. are under crops and grass, the residue being rough grazing. The E. of England is predominantly arable while in the W. dairying predominates, though within a small area a variety of types of farming may be found, and market gardening is often carried on near the larger pop. centres. Stock rearing is carried on in the N.; the fatstock industry is concentrated in the Home Cos., the Midlands, and the E. cos. To some extent fruit and veget-

noteworthy. The pop. in the Eng. rural areas is divided between the farm-unit (particularly in the N.) or small vil., and the market in which often caters for the needs of a considerable locality. The latter will not act as a shopping centre and may have a small local industry (average pop. 5–10,000).

URBAN ENGLAND.—Following on from the previous section, the slightly larger tn, particularly if it is in the centre of an agric. dist., often develops other subsidiary industries, possibly connected with the supply of implements and with engineering (farm machinery and maintenance); here the average pop. is about 10–50,000. Alternatively, these larger tns may form centres for a single industry or industrial process (such as cotton spinning or weaving, coal- or iron-mining); the still larger unit will have a considerable variety of industry, both interdependent (as in the woollen and

cotton tns of Yorks and Lancs) and unrelated (as York, with heavy engineering and chocolate industries, or Luton, with motor-car and hat-making industries). Thirteen Eng. cities have over a quarter of a million inhab. and support a generally centralised and industrialised pop.; these are (in order of size) Birmingham, Liverpool, Manchester, Sheffield, Leeds, Bristol, Nottingham, Hull, Bradford, Newcastle upon Tyne, Leicester, Stoke-on-Trent, and Coventry (q.q.v.). London (q.v.), with its administrative, judicial, and social status, its position as cap. and seat of the central gov., in the middle of the largest conurbation in the country, is unique. It is the official place of residence of the sovereign and focal point for the Commonwealth (see POPULATION, Conurbations, below).

POPULATION.—The census figures for 1951 gave the total pop. for the U.K. as 50,225,000 (24,118,000 males and 26,107,000 females). The total for the U.K. at the mid-year estimate (1955) was 50,968,000. The total pop. of England and Wales at the 1951 census was 43,758,000 (21,016,000 males and 22,742,000 females), the pop. of Wales being 2,599,000, and the total figures at the mid-year estimates for 1955 were 44,441,000 (21,389,000 males and 23,052,000 females) and 2,603,000 respectively. The total number of registered aliens (1955) was 360,399. On the basis of the mid-year estimates (1955), it is estimated that the future total pop. of the U.K. will be 51,796,000 in 1960, 52,624,000 in 1970, and 53,270,000 in 1980, with a drop of 179,000 by 1990.

By far the largest concentration of the pop. occurs in the London and S.E. region (just under 11 million); next in size comes the N.W. region with just under 6½ million. *Conurbations*, or areas of urb. development where a number of separate tns have grown into each other or become linked by a common interest, often industrial, commercial, or educational, exist in the Greater London, S.E. Lancs, W. Midlands, W. Yorks, Merseyside, and Tyneside areas (total estimated pop. at mid-1955, 16,868,000).

Pop. elements include, besides native ones, Asiatic, African, and West Indian (the latter more especially since 1956 when numbers of West Indians arrived to swell the pops. of the larger centres). These elements have been drawn by trade, particularly to those occupations carried on in or near coastal industrial centres, such as shipbuilding and the processing of imports. Continental Europeans, many of whom took up residence in the U.K. as a result of racial or political persecutions in their respective native countries, may also be regarded as constituting a further element.

EMPLOYMENT.—In 1955 distribution of the total manpower of Great Britain in civil employment (i.e. not including members of Her Majesty's Forces and the Women's Services) was among some 24 forms of profession or occupation (as distinguished by the Standard Industrial Classification). The following 13 indus-

tries, arranged in order of total manpower employed, claimed the largest numbers of workers:

Distributive trades	2,811,000
Engineering, shipbuilding, and electrical goods	2,081,000
Miscellaneous services	1,850,000
Professional	1,786,000
Transport and communications	1,715,000
Building and contracting	1,486,000
Public administration (national and local gov. services)	1,289,000
Vehicles	1,231,000
Agriculture, forestry, fishing	1,066,000
Textiles	955,000
Food, drink and tobacco	901,000
Mining and quarrying	862,000
Clothing, including footwear	675,000

(figures to the nearest thousand).

The steel and vehicle and machinery industries, with the other metal and metal-using industries, account for half the total of Brit. exports and employ half of all workers in manufacturing industry.

INDUSTRY.—The U.K. supports a mixed economy (public and private enterprise) and is highly industrialised, the ratio of persons in the mining, manufacturing, and building industries to those engaged in agriculture being 10 to 1. England's natural resources include coal (principally in the W. Riding of Yorks, Manchester area, Northumberland and Durham, and N. Staffordshire) and iron (in the Cleveland Hills, Yorks, W. Midlands, W. Cumberland, and elsewhere), though much of the latter is imported. Clay in Staffordshire gives rise to the industrial area known as the Potteries (q.v.); china clay is found in Cornwall, where formerly copper and tin were also mined. Lead, once found in Derbyshire, is also no longer important commercially. Slate is mined in the Lake Dist.; salt occurring in Cheshire and S. Durham has given rise to the chemical and alkali industries centred in that region. But a great number of raw materials have to be imported (cotton, wool, foodstuffs for processing, industrial metals, etc.). Industry in England is concentrated in London, the Midlands, Yorks, Lancs (S.E. Lancs and Merseyside conurbations), and on Tyneside. London is a centre for the clothing, building, food and drink, printing, furniture, precision instrument, and other highly specialised industries; light and heavy engineering are also carried on. The industries of the W. Midlands conurbation (Birmingham and Wolverhampton area) include electrical goods, engineering, vehicle building, jewellery, precision instruments, chemicals, rubber goods, and hardware. The N. Staffordshire industrial area (centred on Stoke-on-Trent) produces pottery and china, and coal is mined to the N. and E. of Derby and Nottingham. Leicester and Coventry are the other important centres in the W. Midlands industrial region. In W. and S. Yorks the woollen and worsted industry is largely carried on in and around Bradford, Halifax, and Huddersfield, Leeds now being principally a

centre for clothing manuf., though it also has steel and engineering industries. The steel industry of Sheffield is famous, and cutlery, plate, and tools are made there, and heavy engineering carried on. Coal is extensively mined in this area. In Lancs cotton spinning (around Manchester) and weaving (around Blackburn, Burnley, Colne, and Nelson) are carried on; Manchester itself has electrical and heavy engineering industries and coal is mined nearby. On Merseyside the port of Liverpool carries on ship repairing and food processing; Birkenhead has ship-building and repairing industries (the district is scheduled as a development area. On Tyneside there is an extensive coalfield; the 2nd largest shipbuilding area in the U.K. (the largest being in Scotland on Clydeside) is located near the mouth of the Tyne, Tees, and Wear rvs. Steel and engineering are subsidiary industries; new light industries are being introduced in a development area. Fishing (by steam trawlers) is carried on in the North Sea, principally from Hull, Grimsby, Yarmouth, Lowestoft, and Ramsgate (qq.v.); off the SW. coast, principally from Brixham and Plymouth (qq.v.); and off the NW. coast, principally from Tenby, Whitehaven, Fleetwood, Blackpool, Southport, and Liverpool (qq.v.). See FISHERIES.

Other specialised Eng. industrial centres are Northampton (boots and shoes), Leicester (boots and shoes, and hosiery), Nottingham (hosiery, tobacco, bicycles), St Helens, Smethwick, and Stourbridge (glass), Kidderminster and Halifax (carpets), Bristol (tobacco and confectionery), York (chocolate and confectionery), Reading (biscuits). Chemicals are produced on Merseyside and Tees-side; cement is made at centres along the Thames, Medway, and Humber rvs.

Certain essential services and industries are under national ownership and are administered by public corporations; they include coal-mining, inland transport, gas supply, electricity generation and supply, civil air transport, and telecommunications. The Bank of England (q.v.) is governed by a court of directors, 16 in number. The U.K. Atomic Energy Authority is responsible for atomic energy research and development; the first Brit. atomic power station was opened (Oct. 1956) at Calder Hall (see CALDER-BRIDGE), Cumberland. Labour relations rest on the principle of joint consultation between management and workers, mainly through the machinery of employers' associations and trade unions (q.v.).

HISTORICAL MONUMENTS, PLACES OF INTEREST.—England has many attractions for the tourist and traveller, and the prin. places of historic and scenic interest are to be found described in any good guide book. In a short introductory article, only the briefest indications of some of these places can be given; they include monuments and structures dating from prehistoric times, such as the stone circles at Stonehenge and Avebury (qq.v.), neolithic camps like that at Windmill Hill

(q.v.), or later camps such as the Early Iron Age Maiden Castle, and remains of tns, roads, villas, and baths from the period of Rom. occupation (see ROMAN REMAINS IN BRITAIN). Few monuments survive from the A.-S. period, though churches at Bradwell, Bradford-on-Avon, and Canterbury (St Martin's) are among examples of building in stone (see also ENGLISH ARCHITECTURE), and stone crosses include those at Ruthwell and Bewcastle (qq.v.). But from the time of the Conquest England is rich in historical monuments, eccles. and secular, of all periods. Cathedrals of beauty and interest include those at Canterbury (q.v.), Winchester, Chichester, Salisbury (q.v.), Exeter, Wells, Lincoln, Ely, Southwell, Gloucester, Hereford, Chester, Durham, and York (see articles on these cities and YORK MINSTER). Alongside these may fittingly be placed the great ruined abbeys of the N. (Fountains, Rievaulx, Jervaulx, Bolton (qq.v.) and others), and the ruins of Tintern (Monmouth), together with the many historic churches to be found in Eng. tns of all sizes. Among secular buildings, castles may vary from fortified manors such as those at Acton Burnell and Stokesay to the elaborate castle at Windsor; among many may be mentioned Bodiam, Hastings, Tintagel, Warwick, Kenilworth, Corfe, Colchester, Durham, York, Scarborough, Sheriff Hutton, Bamburgh, Alnwick, Warkworth, and the Tower of London (q.v.), in a class by itself. Among great historic houses are the mansions of Blenheim, Longleat, Chatsworth, and Knowle (qq.v.); and houses such as Penshurst Place, Compton Wynyates, the smaller Sulgrave Manor, home of the Washingtons, and Haddon Hall (qq.v.) have their own charm. The smaller Eng. tns too are often most interesting and attractive, and Bourton-on-the-Water, Burford, Lavenham, Ludlow, King's Lynn may be cited among very many other possible choices; such larger centres as Bath, Winchester, Chichester, Lincoln, Norwich, Shrewsbury, Chester, York, the univ. tns of Oxford and Cambridge, Stratford upon Avon (and the Shakespeare vils.) all commend themselves to the visitor. Scenic beauties vary from Kentish apple orchards in spring and hopfields in summer, from the Lincs bulbfields, the fruit-blossom in the vale of Evesham, and the pastoral heart of England, to the wilder beauties of the Eng. Lake Dist. and the moorlands of the SW. (Dartmoor and Exmoor) and the N. cos. Eng. scenery is particularly varied and there are many opportunities for visits to historic buildings and anc't sites, which may be protected by the Ministry of Works, or by the National Trust (q.v.), which also cares for some of the most beautiful parts of the Eng. landscape.

WILD LIFE IN ENGLAND.—*Fauna.*—Despite increasing building and the spread of industry, a considerable number of wild animals may still be observed about the countryside, in fields, woods, and rvs., and (notably in the case of

birds) even in urb. areas. Red deer are to be seen in the Lake Dist. and in Devon and Cornwall, and roe and fallow deer are also found. The ponies of the New Forest are now only semi-wild and the same may be said of the white cattle of Chillingham; among the smaller mammals, otters, badgers, stoats, weasels, foxes, squirrels, hares, and rabbits are to be seen, particularly in the Midlands, though badgers are decreasing in number and rabbits, since the myxomatosis (q.v.) epidemic of 1955, are much less common. Smaller animals still include hedgehogs, moles, voles, mice, shrews, and rats. Eagles, largest of Brit. birds, are no longer seen in England, but game birds include grouse, pheasant, partridge, woodcock, and snipe; many varieties of duck and geese are also seen. Over 420 distinct species of Brit. birds have been listed, of which blackbirds, chaffinches, and robins are the most commonly found; other birds include sparrows, thrushes, starlings, pipits, crows, rooks, swallows, swifts, chiffchaffs, tits, martins, warblers, wrens, larks, peewits, cuckoos, and kingfishers. Only a few marsh birds are found, mostly on the marshland and saltings of E. Anglia. The chalk downs of SE. England are rich in insect life, as is also the Cheshire plain where many kinds are to be observed. Only 75 kinds of butterflies are found in Britain, though there are some hundreds of different moths and about 5000 beetles. Three snakes, the adder (poisonous) and the grass- and ringed snakes (harmless), are found. Lizards, frogs, toads, and newts number only 8 species between them. Fish abound in most Eng. rivs.; trout, salmon, roach, bream, dace, carp, occasionally pike, are all found.

Flora.—The trees of England, though no longer so numerous as once they were, are still a feature of the Eng. landscape. The great oak forests of former days are now diminished, but oaks are still found in considerable quantity, along with ash, thorn (hawthorn, blackthorn, etc.), elm, beech, horse- and sweet chestnut, sycamore, hornbeam, walnut, lime, cedar, yew, spruce, fir and pine, willow, and alder. Hedgerows are usually of thorn or hazel and are a conspicuous feature of the landscape in the more fertile dists., being replaced on the wilder uplands by dry stone walling; often blackberries are found in Eng. hedges, together with a variety of climbing plants. Other wild fruits include strawberries and bilberries (also known as whinberries), and a number of edible fungi are found, the most popular being the mushroom. Since only a very few plants are confined to Britain, Eng. flowers must be looked upon as part of a common European flora. Common flowers are bluebells, wood anemones, primroses, violets, wild roses, honey-suckle, found in hedgerow and wood; willow-herb, foxglove, field geranium, loose-strife, rest-harrow, harebells, scabious, celandine, coltsfoot, bugle, the various vetches, campons, daffodils, daisies, and buttercups are found in

many places, though the varieties of flowers found differ from dist. to dist. and from one geographical div. to another throughout the country. A very few rare plants are peculiar to E., among them the Cheddar pink; in some of the valleys of the N. country alpine flowers are found.

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England, Church of, a title which, as *Ecclesia Anglicana*, first appears in Magna Carta, 1215, to describe the Catholic Church in Britain. For the hist. of *Ecclesia Anglicana* up to the time of the Reformation see CHURCH HISTORY. Though some protestant ideas were circulating in England before 1530, England's

break with Rome was basically the result of political events arising from Henry VIII's desire for a male heir and his infatuation with Anne Boleyn. Pope Clement VII was unable to grant the annulment of Henry's marriage with Catherine of Aragon. Henry, relying on national patriotism, proceeded to limit the papal power in England. Convocation was compelled (1531) to acknowledge the king as 'supreme head of the English Church and clergy,' but added 'so far as the law of Christ will allow.' Acts forbidding the payment of Annates, appeals to Rome, payment of papal fees, and applications for papal dispensations quickly followed. The royal supremacy was embodied in an act of 1534. Meanwhile Cranmer (q.v.), archbishop of Canterbury, declared null the marriage with Catherine, and Henry married Anne Boleyn. Henry's lust for power was fed by success and his greed led to the indiscriminate suppression of the monasteries. Yet he did not intend any alteration of Catholic doctrine. To deny Transubstantiation was as dangerous under him as to deny his supremacy. Under Edward VI reformation went on apace. Prayer Books (q.v.) in English were produced (that of 1549 conservative, that of 1552 more radical) and fastened on the nation by Acts of Uniformity. Under Mary the realm was reconciled with Rome; but Mary's Sp. marriage, and the numerous executions of recalcitrant reformers, alienated even conservatives. Elizabeth came to the throne (1558) determined to unify the nation. Her Act of Supremacy avoided the term 'supreme head,' asserting her merely to be 'supreme governor.' The Act of Uniformity (1559) restored the 1552 Prayer Book but with significant Catholic amendments. Elizabeth's settlement was opposed by the Puritans, who objected to the vestments and ceremony still allowed by the Prayer Book, and by those who still clung to the papacy. The latter were treated tolerantly until in 1570 Pius V misguidedly pub. a bull excommunicating and deposing the Queen. Jesuits were secretly sent to England, and conspiracies against the Queen were formed. Her policy was then reversed. Penal statutes visited papists with fines and imprisonment, and some 200 were executed on charges of treason. At the same time non-conforming Puritans were imprisoned or banished. By the end of Elizabeth's reign, the Church, for which Richard Hooker (q.v.) was the great apologist, and the Prayer Book had gained the allegiance of the majority of the people.

After the Civil war, the C. of E., identified too closely under Archbishop Laud (q.v.) with the royal tyranny, came near extinction. But England found a small taste of Puritanism sufficient and welcomed the restoration of the monarchy, 1660, the re-estab. of episcopacy, and the return of the clergy to their par. The Savoy Conference, 1661, rejected Puritan demands for radical Prayer Book changes, and the book as revised by the Convocations and annexed to the Act of Unifor-

mity, 1662, made no concessions to them. This is regarded as the last stage of the Reformation Settlement. The C. of E. claims to be reformed on scriptural and primitive catholic lines, to be Protestant against papal claims and late accretions in doctrine and practice, but Catholic in retaining the anct. creeds, ministry, and sacraments, and the appeal to scripture: no new Church was founded, but the anct C. of E. reformed herself.

But she was no longer the church of the whole people. Non-conformists, Rom. Catholic and Protestant, were organised outside her. Legislation against them (e.g. the Conventicle Act, 1664, the Five Mile Act, 1666, and the Test Act, 1673) was but slowly relaxed. Yet toleration gradually was estab., the last stage being the Rom. Catholic Relief Act, 1829.

After the Restoration those schools of thought emerge which exist today in the C. of E. In the latter part of the 17th and the early 18th cents., High Churchmen (q.v.) like Jeremy Taylor, Cosin, John Pearson, Ken, Sancroft, and Thomas Bray were among her leaders. Some of the best were lost to the Non-juring Schism (*see* Non-Jurors). As the 18th cent. advanced, religious and moral standards declined, but the Church yet produced John Wesley, Joseph Butler, Samuel Johnson, John Venn, and Charles Simeon. In high places Latitudinarians held sway, children of the 'age of reason,' who asserted the reasonableness of Christianity against the prevailing agnosticism and atheism. Disliking enthusiasm, they were indifferent to church order and dignity in worship, but usually men of intellect and moral integrity. Their failures were worldliness and place-seeking; they were not inspiring leaders. Reaction followed, and the Wesleys and George Whitfield, whose preaching aimed at individual conversion and personal devotion to Christ, initiated the Evangelical revival. John Wesley remained in the C. of E., but after his death the Methodists separated from her. Among the many evangelicals who remained in the fold, Venn, Simeon, John Newton, and Wm Wilberforce were outstanding, zealous in charitable works, eager for the conversion of the heathen, and for social righteousness. They founded the Church Missionary Society (q.v.), 1799, the Brit. and Foreign Bible Society, 1804, and many Sunday Schools. They are the forerunners of the 20th-cent. Evangelicals or Low Churchmen, as the Latitudinarians are of the Modern Churchmen.

But in the early 19th cent. the Church remained generally apathetic. Exceptions were the Evangelical par., some clergy in whom High Church principles were still cherished, and the group which Dr Thomas Arnold inspired. He hoped for a National Church which, by excluding all but a few central doctrines, would include all Christians, and bring religion into the people's daily life. But this impracticable scheme was overshadowed by the Oxford Movement (q.v.). John Keble's assize sermon at Oxford, 1833,

on 'National Apostasy' was occasioned by Parliament's proposal to suppress 10 Irish bishoprics. Other Oxford churchmen rallied to the call. R. H. Froude, J. H. Newman, and E. B. Pusey. They began to issue their 'Tracts for the Times' (hence the name 'Tractarian') recalling the Church to its belief in itself as divinely founded, and appealing especially to the Fathers and the Creeds. Newman, in Tract 90, argued that the 39 Articles (q.v.) were susceptible of a Catholic interpretation. This aroused antagonism. His secession to Rome (1845), followed by others, accentuated the fear that the movement was a papist conspiracy, and the establishing of a Rom. hierarchy in England, 1850, did nothing to allay it. But the movement progressed. Religious communities were founded for women, and later for men, and colleges at the univs. and public schools. Choral services with surpliced choirs were introduced, more frequent Holy Communion, the opening of churches on week-days, long-necked vestments and ceremonial. The Puseyites, or Ritualists as they were called, denied the spiritual authority of the Judicial Committee of the Privy Council, which since 1833 had been the court of appeal in eccles. cases, and preferred imprisonment to accepting its decisions, thus gaining public sympathy.

The events of the 18th cent. showed the need for adjustment in Church and State relations, and the Life and Liberty Movement, led by William Temple (q.v.), secured the Enabling Act, 1919, setting up the National Assembly of the C. of E. (q.v.), to prepare measures for parl. assent in matters concerning the Church. In 1927 the new Assembly put forward a completely revised Prayer Book, but the House of Commons narrowly rejected it. Alterations were made but again in 1928 the Commons rejected the book. The Upper Houses of Convocation however agreed not to prevent its use, and parts of it have been generally adopted. The question had been raised in an acute form of the right of a parliament, many of whose members were not churchmen, nor even necessarily Christian, to determine the public worship of the Church. This quickened the demand for disestablishment (q.v.). Many, however, even outside the Church, thought that it would be a retrograde step, with repercussions far beyond this country, for the State to withdraw official recognition from the historic Church of the land, and this kept the problem in the background. The Convocations (q.v.) and Church Assembly, in the decade following the Second World War, began a revision of the Canon Law (q.v.) and a reconstruction of the Eccles. courts, to ease and stabilise the Church's position *vis-à-vis* the State.

The 20th cent. saw a growing movement for union with other Christian bodies, and with this the Lambeth Conferences (q.v.) of 1920 and 1930 were largely concerned. Hopeful conversations with Rom. theologians under Cardinal Mercier at Mâlnes (1921-25) were forbidden after 1926 by

the Vatican. But exploratory discussions with Methodists and with the Church of Scotland (Presbyterian) in the 2nd half of the 20th cent. showed how the climate of opinion has changed since the 19th cent. (See UNION OF THE CHURCHES.)

The report of the Archbishop's Commission on Doctrine, pub. 1938, frankly set out variations in doctrinal opinion held within the C. of E., which are often considerable though held by men who believe themselves loyal to the Christian tradition. This apparent disunity leads some to seek refuge in the infallibility of Rome, or in Protestant fundamentalist sects. But a Church which attempts to keep Catholic, Evangelical, and Liberal within one fellowship and holds that Christianity must have room for more than a single intellectual outlook or devotional temper attracts people of many kinds to find in her their spiritual home.

The strength of the C. of E. is hard to estimate. Nominally it is enormous. But in 1953 there were 2,068,829 Easter communicants, not including the armed forces, Cathedrals, schools, hospitals, and similar bodies. There were just under three million on the electoral rolls of par. In the same year 408,769 persons were baptised, and 154,548 confirmed. 49.6 per cent of the country's marriages were solemnised in the C. of E. in 1952.

The C. of E. strictly comprises two provs. only, Canterbury (29 dioceses) and York (14 dioceses). The Welsh sees ceased to belong to the former in 1920, when they were disestablished and disendowed and became a separate self-governing prov. (see WALES, CHURCH IN). The Episcopal Church of Scotland, under its Primus, has been an independent prov. since the Civil war. See also IRELAND, CHURCH OF. For the growth of Anglicanism overseas, see ANGLICANISM. See also H. Wakeman, *Introduction to the History of the Church of England*, 1898; H. Henson, *The Church of England*, 1939; C. M. Ady, *The Church of England and How it Works*, 1940; C. F. Garbett, *The Claims of the Church of England*, 1947; R. Lloyd, *The Church of England in the Twentieth Century*, 2 vols., 1946, 1950; J. R. H. Moorman, *A History of the Church of England*, 1953.

England, New, see NEW ENGLAND.

Englewood, city of Bergen co., New Jersey, U.S.A., 1 m. W. of the Palisades of the Hudson R. It is a residential suburb of New York, from which it is 14 m. distant. It manufs. leather goods, lighting fixtures, drugs, elevators, and metal products. Pop. 23,145.

English Architecture. This article, like those on the architecture of other countries, deals only with the special national characteristics of the various periods; with typical buildings in each, and the names of their architects where those are known. For the general characteristics of the various periods, see ARCHITECTURE (ROMAN, ROMANESQUE, GOTHIC, RENAISSANCE, NINETEENTH CENTURY, TWENTIETH CENTURY); also ARCHITECT; CASTLE;

CATHEDRAL; CHURCH; HOUSE; MONASTERY; RESTORATION; TEMPLE; TOWN-PLANNING; and on structural details: BUTTRESS; COLUMN; DOOR; TRACERY; VAULT. (Separate articles describe IRISH and SCOTTISH ARCHITECTURE.)

Excluding primitive hut-dwellings, and such prehistoric monuments as Stonehenge and Maiden Castle, the oldest buildings in England that merit the name of architecture were erected during the Rom. occupation of Britain, terminating c. AD 410. They resemble Rom. architecture of other provinces of the Empire, and are somewhat less ambitious and elaborate than those of the city of Rome itself. Most of them are to be found in certain of the larger Rom. towns: Camulodunum (Colchester), Verulamium (St Albans), Aquae Sulis (Bath), Calleva Atrebatum (Silchester), Viriconium (Wroxeter), and Isca Silurum (Caerwent). Other important towns—e.g. Londinium (London), Eboracum (York), Ratae (Leicester), Lindum (Lincoln), Glevum (Gloucester), and Corinium (Cirencester)—have yielded comparatively few remains; usually because later building has smothered or destroyed the Rom. work, or because they have not yet been thoroughly excavated.

Rom. buildings in Britain comprise (i) amphitheatres (an especially fine example is at Caerwent, Mon.); (ii) theatres (the best being at Verulamium); (iii) secular basilicas, including a large one under Gracechurch Street, London, and smaller examples at Cirencester, Silchester, Wroxeter, and Caerwent; (iv) public baths, especially at Bath, but also at Leicester, Silchester, and Wroxeter; (v) temples; none now remaining above ground-level but foundations of a large one at Colchester, also numerous temples to the oriental deity, Mithras, also the remarkable example recently discovered in Walbrook, London; (vi) Christian churches, the only survivor being a fragment of a small basilican church at Silchester, c. 410 (public buildings were generally grouped round the forum or market-place, as at Verulamium); (vii) in-houses, best studied at Verulamium, where the streets form a chess-board pattern, with houses centrally heated by hot air, equipped with baths, and provided with mosaic floors; (viii) villas or country-houses from which farming was carried on, some of them having over fifty rooms, and most having central heating, baths, and mosaic floors. They are chiefly situated S. and E. of a line from York to Exeter, the best examples being at Bignor (Sussex), Brading (Is. of Wight), Chedworth (Glos), Folkestone (Kent), Northleigh (Oxon), and Woodchester (Oxon).

Little evidence remains of the buildings which the first Anglo-Saxon settlers must have erected during the period c. 410–597. The next phase began with the landing of St Augustine in Kent in 597. His speedy conversion of the Kentish king resulted in the erection of Christian churches in Canterbury (SS. Peter and Paul, 597; St Pancras, c. 600; St Mary, c. 620); also

St Andrew, Rochester, 604; St Mary, Lyminge, c. 633; St Mary, Reculver, 669—all these in Kent. St Peter, Bradwell (Essex), was built c. 680; and at Brixworth (Northants) was erected a large church, c. 670, which still survives, and has been described by a leading authority as 'perhaps the most imposing monument of the 7th century yet surviving north of the Alps.' It has a long aisled nave with semicircular brick arches, a small apsidal chancel, and a timber roof.

Only a few years later, a 2nd group of Christian churches was erected in the former 'kingdom of Northumbria,' as a result of missionary activity by Benedict Biscop, who had studied in Rome. His 3 churches, all very small and roughly built, are at Monkwearmouth (674), Jarrow (chancel only, 682), and Escomb (about the same date). In Hexham Abbey and Ripon Cathedral are crypts of this period, built c. 675 by St Wilfrid, Archbishop of York.

During the 8th and 9th cents., mainly because of Dan. invasions, there was another lull in church-building. The next phase began early in the 10th cent.

Between that date and the Norman conquest of England in 1066 a number of churches were erected. They used to be called 'Saxon,' but, because they represent only a ruder form of Continental 'Romanesque,' they are now generally classified under that head as 'Pre-Conquest Romanesque,' whereas those built after 1066 are 'Post-Conquest Romanesque' (not 'Norman' as they were commonly called a generation ago). Nothing remains to-day of Pre-Conquest domestic architecture, and the following are the chief surviving Pre-Conquest Romanesque churches.

10th century. Deerhurst (Gloucestershire); Bradford-on-Avon (Wilts); Wing (Buckinghamshire); Worth (Sussex); Earl's Barton (Northants); Barton-on-Humber (Leicestershire); St Benet, Cambridge; Wittering (Northants); Breamore (Hants). (St Mary-in-Castro, Dover, may be of either the 10th or the 11th cent.)

11th century. Rosham (Sussex); Sompting (Sussex); the foundations of Elnham Cathedral, Norfolk, and of St Augustine's Abbey, Canterbury; also possibly the curious little timber church at Greenstead, near Ongar in Essex. The first abbey-church at Westminster was begun c. 1050 and dedicated in 1065.

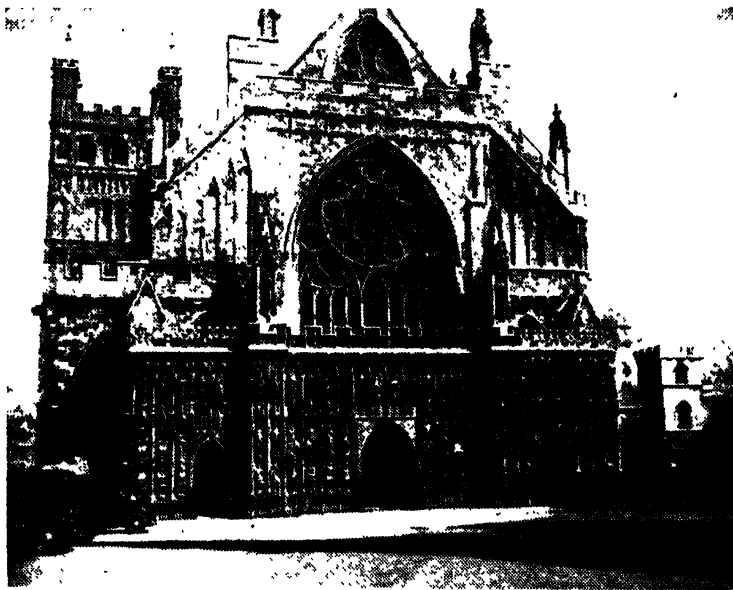
Surviving buildings of the Post-Conquest Romanesque (or 'Norman') period, 1066–c. 1200, consist almost entirely of churches and castles. The feudal lords lived in castles, the peasantry in wretched shacks of wood, or of wattle-and-daub, which have perished long ago, and there were hardly any middle-class people requiring houses. The so-called 'Jews' Houses at Lincoln, built of stone, are among the few that remain.

Of the various types of castle (see CASTLE), the chief Eng. examples are: (i) *Motte* type, Thetford in Norfolk; (ii) *Shell-keep* type: Arundel, Carisbrooke, Clifford, Exeter, Ludlow, Peak; (iii) *Rec-*

tangular keep: London ('the Tower'), Castle Rising, Dover, Heddingham, Middleham, Newcastle upon Tyne, Norwich, Portchester, Rochester, Scarborough; (iv) *Twelve-sided keep*, Orford in Suffolk; (v) *Round keep*: Conisborough, Pembroke, and Windsor (but the so-called 'Round Tower' at Windsor was considerably raised in height during the 19th cent.).

Post-Conquest Romanesque may be studied in the following cathedrals:

not until the 11th cent. that they began to produce architecture of any importance in Normandy. Hence the progress of Romanesque architecture in England and Normandy moved on parallel lines until the end of the 12th cent.; when, in both countries, the pointed arch was introduced and the Gothic period began. From that date fundamental differences began to appear between Fr. architecture (q.v.) and Eng.; these differences becoming



EXETER CATHEDRAL: WEST FRONT

Chichester, Durham, Ely, Exeter, Gloucester, Hereford, Norwich, Oxford, Peterborough, St Albans, Winchester; in Tewkesbury and Waltham Abbeys; and in par. churches at Adel (Yorks), Barfreston (Kent), Ilfley (Oxon), Kilpeck (Herefordshire), Melbourne (Derbyshire), St Peter at Northampton, Stewkley (Buckinghamshire); also in the wonderful little Chapel of St John in the Tower of London.

In England, as elsewhere, round arches were invariably used throughout the Romanesque period. The flow of architectural influence into England continued to be from France, as it had been before the Conquest; but the Normans had only recently become skilful builders and designers. When they invaded Normandy from Scandinavia in the 9th cent. they were barbarous pirates like the Danes who ravaged England; and it was

progressively more marked up to the end of the Gothic period (c. 1540 in England).

The successive stages of Eng. Gothic architecture may be classified as: (i) Early Eng., or Early Pointed, c. 1200-c. 1300; (ii) Decorated, or Middle Pointed, c. 1300-c. 1370; (iii) Perpendicular, or Late Pointed, c. 1370-c. 1540. There was no abrupt line of change between these various periods; each merged into the next by a gradual transition, as new structural or decorative features were introduced; and sometimes they overlapped. One of the simplest ways of distinguishing them is by the design of their windows (*see TRACERY*); but more important is the gradual development of vaulting and buttressing, whereby the thick walls and heavy barrel-vaults, the flat buttresses, and the narrow windows of the 12th cent.

came to be replaced by bolder buttresses, thinner walls between them, thinner vaults supported on stone ribs, and much larger windows filled with tracery; until, in such late examples as King's College Chapel at Cambridge (1446-1515) and Henry VII's Chapel at Westminster (1500-12), the walls have become a mere paneled screen, mostly filled with glass—all the weight of the thin vaulted roof being carried by stone ribs converging on to very bold buttresses, capped with tall pinnacles which help to neutralise the downwards and outwards 'thrust' of the vaulting ribs, or (if there is no vaulting) of the timber roof-trusses.

Following are the chief examples of the 3 Gothic periods.

(1) *Early English*. Cathedrals: most of Salisbury; most of Lincoln except the choir and W. front; the W. fronts of Peterborough and Ripon; the choirs of Lichfield, Southwark, Southwell, and Worcester; most of Wells including the W. front; the nave of York; the 'Chapel of the Nine Altars' at Durham. Other buildings: the choirs of Westminster Abbey and of the Temple Church in London; the choir and transepts of Beverley Minster.

(2) *Decorated*. Cathedrals: the naves of Exeter and Lichfield; the choirs of Bristol, Lincoln, and St Albans; the choir, W. front, and chapter-house of York; the chapter-houses of Salisbury, Southwell, and Wells. Other buildings: the nave of Beverley Minster, the par. church of Heckington, Lincs.

(3) *Perpendicular*. Cathedrals: the naves of Canterbury, Manchester, and Winchester; the choirs of Gloucester and York; the cloisters of Gloucester; the W. fronts of Winchester and Gloucester. Other buildings: Sherborne Abbey; the W. front of Beverley Minster; St George's Chapel, Windsor; King's College Chapel, Cambridge; Henry VII's Chapel, Westminster; the roof of Westminster Hall; sev. of the older colleges at Oxford and Cambridge.

The Renaissance movement in Italy began to influence E. A. early in the 16th cent., but at first was confined to small ornamental details imported from Italy (e.g. the terracotta busts of Rom. emperors at Hampton Court, c. 1520) or carried out by imported It. craftsmen (e.g. Torrigiano's tomb for Henry VII in Westminster Abbey, 1512). It. ornamental features soon came to be copied by Eng. craftsmen, and books of engravings of the 'Orders' (q.v.) and other Rom. architectural details were compiled, mainly in Germany and the Netherlands, and were studied in England. The first stage of transition from Gothic to Renaissance is sometimes called 'Tudor,' the period 1558-1603 is commonly known as 'Elizabethan,' and that from 1603 to c. 1630 as 'Jacobean.'

Church-building was almost in abeyance from c. 1540 to c. 1660, owing to religious turmoil and to the existence of a surplus of medieval churches—partly the result of over-building during the 'Age of Faith,' partly owing to the dissolution of the

monasteries. The most important example is St John's Church, Leeds (1634), which is entirely Gothic in structure and general design, but contains magnificent 'Jacobean' (strictly 'Carolean') interior woodwork fittings. The Tudor, Elizabethan, and Jacobean periods, however, saw a great boom and revolution in the building of houses and of grammar schools and colleges. An extreme example of the application of Rom. features is the 'Tower of the Five Orders' (1613-18) at the Bodleian Library, Oxford; where the classic Orders are applied as mere decoration to a building with mullioned windows, battlements, and pinnacles, erected at the same time.

A sudden and violent change to full-blown It. Renaissance architecture occurred early in the 17th cent., when Inigo Jones (q.v.) appeared upon the scene, and designed the Queen's House at Greenwich, 1617-35, and the Banqueting House in Whitehall, 1619-22. Gothic architecture died very slowly, especially in Oxford; but, from c. 1640 onwards up to c. 1830, all E. A. was based on that of Rome, save for a few exceptions that led to the 'Greek Revival' and the 'Gothic Revival' towards the end of that period. The 'Georgian Period' lasted from 1714 to 1820, strictly speaking, and therefore includes the 'Regency Period' of 1810-20; but both are commonly extended to 1830 or even to 1837.

'Palladian' architecture includes not only the work of Inigo Jones (q.v.), but also that of many architects of the 18th cent. who followed Palladio (q.v.) rather than Wren (q.v.). Buildings of the period include many vast aristocratic mansions, such as Hlenheim, Castle Howard, Holkham, Kedleston, Harewood, Kenwood, and Chatsworth; many charming Georgian houses; St Paul's Cathedral, many churches of the new 'Protestant' type, and Nonconformist meeting-houses; important public buildings such as Greenwich Hospital, Chelsea Hospital, and Somerset House. For the leading architects of the period and their works (in addition to JONES and WREN already mentioned) see ADAM (J. and R.); ALDRICH; ARCHER, T.; BOYLE, R. (Lord Burlington); BROWN, L.; BURTON, D.; CARR, J.; CHAMBERS, SIR W.; COCKERELL, C. R.; DANCE, G.; ESSEX, J.; GANDON, J.; GIBBS, J.; HAWKSMOOR, N.; HOLLAND, H.; KENT, W.; NASH, J.; SOANE, SIR J.; VANBRUGH, SIR J.; WEBB, J.; WILKINS, W.; WOOD, J.; WYATT, J.; WYATVILLE, SIR J.

The period c. 1830 to c. 1900 may be called the 'Victorian' phase, and was notable for a continuous struggle between the supporters of revived Classic (i.e. Greek and Rom.) and revived Gothic architecture, as explained in the article ARCHITECTURE: VIII. For the leading architects of the Victorian period and their buildings, see BARRY, SIR C.; BASEVI; BELCHER, J.; BENTLEY, J.; BLOMFIELD, SIR A. and SIR R.; BODLEY, G.; BURGESS, W.; BUTTERFIELD, W.; ELMES, H. L.; GEORGE, SIR E.; JACKSON, SIR T. G.; PEARSON, J. L.; PUGIN,

A. W. N.; SCOTT, SIR G. G. (Senior); SHAW, R. N.; STREET, G. E.; TITE, SIR W.; WATERHOUSE, A. (See also GRIMTHORPE, LORD; and PAXTON, SIR J.)

The movement towards less imitative and more 'functional' architecture is described in ARCHITECTURE: IX. For leading architects of the cent. 20th and their buildings, see ABERCROMBIE, SIR P.; BAKER, SIR H.; BURNET, SIR J.; COLLICUTT, T. E.; COOPER, SIR E.; EASTON, J. M.; FRV, E. M.; GIBBERD, F.; HARRIS, E. V.; HOLDEN, C. H.; HOLFORD, SIR W.; KNOTT, R.; LANCHESTER, H. V.; LETHABY, W. R.; LORIMER, SIR R.; LUTYENS, SIR E.; MACKINTOSH, C. R.; MAUFE, SIR E.; RICHARDSON, SIR A. E.; ROBERTSON, SIR H. M.; SCOTT, SIR GILES; SPENCE, B.; UNWIN, SIR R.; VOYSEY, C. F. A.; WEBB, SIR A.

See SIR R. Blomfield, *Short History of Renaissance Architecture in England*, 1900; E. S. Prior, *History of Gothic Architecture in England*, 1900; J. A. Gutch, *Early Renaissance Architecture in England*, 1901; F. Bond, *Gothic Architecture in England*, 1906, *English Church Architecture* (2 vols.), 1913; W. H. Godfrey, *Story of Architecture in England* (2 vols.), 1928-31; A. W. Clapham, *English Romanesque Architecture* (2 vols.), 1930-34; F. R. S. Yorke and C. Penn, *A Key to Modern Architecture*, 1939; S. Sitwell, *British Architects and Craftsmen, 1600-1830*, 1945; M. S. Briggs, *Building Today*, 1945; A. H. Gardner, *Outline of English Architecture*, 1945; R. Turner, *Nineteenth Century Architecture in Britain*, 1950; J. H. Lees-Milne, *Tudor Renaissance*, 1951; H. S. Goodhart-Rendel, *English Architecture since the Regency*, 1953.

English Art. Medieval Art.—Medieval E. A. finds expression chiefly in Gothic architecture, and in sculpture as applied to eccles. buildings. The Fr. Gothic style spread throughout Europe through the monasteries, and it was natural that the variety of historical conditions and ideals, no less than of climate and materials, in the different countries into which the style spread should lead to the formation of a new national style in each, though all manifest a common origin. (See ARCHITECTURE: VI.)

English Painting.—Few examples survive of Eng. medieval painting. It is known that in England, as elsewhere in Europe, painting flourished under the aegis of the Church. National characteristics did not begin to emerge until the 7th and 8th cents., and found expression particularly in the illuminated manuscripts of the period. The schools of Winchester and Canterbury produced manuscripts which were esteemed throughout Christendom. The decoration of churches encouraged wall painting and panel painting. In the 13th cent. painting flourished under the patronage of Henry III, who made London a centre of art. The mural paintings of the Palace of Westminster, now destroyed, were outstanding examples of Eng. painting of this period. In the 14th cent. E. A. declined as a result of the Wars of the Roses, and the decline was

further hastened by the Reformation. Many early works of art were destroyed, and this iconoclasm continued into the 17th cent. The reign of Henry VIII virtually put an end to church painting, and it may be said that painting, particularly portrait painting, survived only through the influence and example of Hans Holbein (q.v.). The best artists of the time were, like Holbein, visitors from the Continent. In Elizabeth's reign, however, Eng. painting gained a native excellence in the work of the miniaturists, notably Nicolas Hilliard (1537-1616), Isaac Oliver (1564-1617), and his son, Peter Oliver (1594-1646) (qq.v.).



W. F. Mansell

HANS HOLBEIN, A SELF-PORTRAIT

In the Stuart period Eng. painting again owed its renewed impetus to the influence of a foreigner, Sir Anthony Van Dyck (q.v.), who settled in England after a preliminary visit in 1620, becoming court painter to Charles I. Among his successors were William Dobson (1610-46), the Cavalier painter (q.v.), and Robert Walker (1600-59), who painted portraits of Oliver Cromwell and other Puritan leaders. During the Commonwealth and after the Restoration the influence of foreign artists working in England continued. First among them was the Dutchman, Sir Peter Lely (q.v.), and later Sir Godfrey Kneller (q.v.) who came to England from Germany in 1674. There are few Eng. painters of the period to put beside Lely, except John Riley (1646-91) and Robert Streater (1624-80), whose mural paintings were notable in an age of portraiture. In 1711 Kneller founded a school which was the precursor of the

Royal Academy, founded nearly 50 years later when, in 1760, Sir Joshua Reynolds (q.v.) became its first president. Kneller's facile production debased the tradition of Van Dyck, but the ascendancy of fashionable portrait painting was challenged by the genius of Wm Hogarth (1697-1764) (q.v.), who by the realism and sincerity of his descriptive scenes from contemporary life strongly influenced the development of indigenous art at a time when it had sunk to shallowness and artificiality. His axiom that the only school was that of nature needs no

tion of natural subjects, but also a delicate touch as a painter and great power as a colourist. Reynolds was greatly influenced by It. painting, and his visit to Italy in 1749 was a landmark in his life. Gainsborough, who never left England, was influenced more by the Dutch painters and by Rubens. A successful follower of Gainsborough was George Morland (1763-1804) (q.v.), best known as a landscape painter. He also painted sporting and animal pictures, a genre which with the outstanding example of George Stubbs (1724-1826) (q.v.) enjoyed



CONSTABLE'S 'FLATFORD MILL'

emphasis to-day. Though it was scarcely recognised in his time, it was destined to become the very keynote of E. A., and the measure of the debt to his work is to be gauged accordingly.

Gainsborough (1727-88) (q.v.) is regarded as the 'father of modern Eng. painting.' A rival of his great contemporary, Reynolds, as a fashionable portrait painter, he excelled in landscape painting. Landscape, which is the great glory of Eng. painting, was estab. in England by the work of foreign artists, but Richard Wilson (1713-82) (q.v.), who studied for some years in Rome, gained a reputation abroad which brought greater recognition to landscape painting in his own country although he himself was on the whole neglected. Whereas Wilson painted nature in the grand manner, Gainsborough brought to his landscapes a more personal and romantic feeling. He had not only a deep and intimate knowledge and percep-

tion of natural subjects, but also a delicate touch as a painter and great power as a colourist. Reynolds was greatly influenced by It. painting, and his visit to Italy in 1749 was a landmark in his life. Gainsborough, who never left England, was influenced more by the Dutch painters and by Rubens. A successful follower of Gainsborough was George Morland (1763-1804) (q.v.), best known as a landscape painter. He also painted sporting and animal pictures, a genre which with the outstanding example of George Stubbs (1724-1826) (q.v.) enjoyed

a vogue in the 18th and 19th cents. with the work, besides Stubbs and Morland, of James Ward (1769-1859) (q.v.), John Herring (1795-1865), Sir Edwin Landseer (1802-73) (q.v.), Thomas Cooper (1803-1902), and George Mason (1818-72). With Gainsborough, Constable (1776-1837) (q.v.) and Turner (1775-1851) (q.v.) stand at the beginning of modern art in England. The influence of Constable as landscape painter was profound, and made itself felt on the Continent, especially in France, where he may be said to have been the true inspiration of the Barbizon school (see BARBIZON) led by Millet and Corot. All through the Victorian period of E. A. academic and classic subject matter vied with nature in favour, and it would be difficult to say whether the realism of Constable was more highly favoured than the idealism of Turner or the pseudo-classicism or romanticism of Lord Leighton (1830-96)

(q.v.). Certainly the landscape painters have endowed Eng. painting with a more permanent heritage than have the great portrait painters of the 18th cent., whose classicism was not followed by their successors. Constable was the first painter to see that nature ignores conventions of beauty and propriety—a negative principle which lies at the root of all naturalistic art to-day. His cloudy skies and leaves glittering in sunlight reveal the innovator in light effects. Turner (q.v.), who doubtless gained much from others, stands alone as the most significant figure in Eng. painting. He is aptly regarded as being in E. A. what Shakespeare is in Eng. literature. His exemplar was Claude Lorraine, but he surpassed the Fr. artist in atmosphere and in breadth of conception, however inferior he was in technique and the qualities of form. Turner's dreams of classic Italy and Greece are for many the only Italy and Greece of old. As a colourist, he has been called the 'father of Impressionism.' Among nature painters Turner is unique, conveying through a novel and marvellous use of colour his individual vision of light; in him E. A. has affinities with Rembrandt before him and with Monet after. Mention may also be made here of Richard Parkes Bonington (1801-28) (q.v.), a painter of great promise whose style, learnt in France, was itself an influence on Fr. painting. Of the same period as Constable and Turner was John Crome (q.v.), who founded the Norwich Society of Artists in 1803. The dominant characteristic of this school of painting was sincerity and freshness of outlook. If Eng. painting owes less to him in the new naturalistic and impressionist interpretation of familiar nature than to Constable and Turner, there are beauty and meaning in his work, and more of poetic quality in it than in his master, Hobbema, whose traditions he carried on, however unconsciously, in England. Associated with Crome are the younger Crome (1794-1842), John Sell Cotman (1782-1842) (q.v.), James Stark (1794-1859), George Vincent (1796-1836), and John Ladbroke (1803-79). Of these, Cotman is especially noteworthy for his influence in the development of the art of water-colour painting in England, his work in this medium being supplemented by a group of contemporary Eng. artists including John Robert Cozens (1752-87) (q.v.), Thomas Girtin (1775-1802) (q.v.), Copley Fielding (1787-1855) (q.v.) in marine studies, Samuel Prout (1783-1852) in architectural work, and David Cox (1793-1859) (q.v.), the group being famous as 'the English School' and attaining its furthest point in the work of Turner. In the strange visions of the 'other world' of William Blake (1757-1827) (q.v.) we have an original vein of imaginative art, and so inimitable as to make him the great pictorial mystic of the world. Though in form he is often grotesque, the reverse of naturalistic, even to inaccuracy of outline as in his picture of the Resurrection, he is the first of Eng. poet painters.

Of the same great period of E. A., striking an equally distinctive note, are James Gillray (1757-1815) (q.v.) and Thomas Rowlandson (1756-1827) (q.v.), caricaturists of manners and customs, whose tradition was carried on by George Cruikshank (1792-1878) (q.v.). In portrait painting Reynolds is the Eng. classic. He had a wide knowledge of It. painting, and from the work of Cresspi and others he no doubt formulated his maxim that 'it is not the eye but the mind which the painter of genius desires to address.' Hence he painted his sitters not in fashionable dresses, as being 'too particular and individual,' but in non-committal costume: thus his portrait of Mrs Siddons is in some ways reminiscent of Michelangelo's 'Isaiah.' Besides Reynolds, the great names in E. portraiture are those of Romney (1734-1802) (q.v.), John Hoppner (1758-1810) (q.v.), and Sir Thomas Lawrence (1769-1830) (q.v.), whose brilliant work marks an epoch in E. A. and had its influence in France. Other names of this period important in E. A. are those of Sir David Wilkie (1785-1841) (q.v.) and William Etty (1787-1849), both popular genre painters. Mention must also be made of James Northcote (1746-1831) (q.v.) and John Opie (1761-1807) (q.v.), both of whom painted historical pictures in the grand manner which was the vogue in the early 19th cent. Thomas Stothard (1755-1834) (q.v.), in the illustration of the novels of Fielding, Richardson, Sterne and Smollett, initiated a revolution in book illustration which was later to develop into one of the most striking art movements of the cent.

Eng. painting during the second half of the 19th cent. was dominated by the Pre-Raphaelite Movement, named from the Pre-Raphaelite Brotherhood which was formed in 1848 by Dante Gabriel Rossetti (1828-82), William Holman Hunt (1827-1910), and John Everett Millais (1829-96) (q.v.). Other artists later joined the Brotherhood, while from the start Ford Madox Brown (1821-93) was associated with it. (See PRE-RAPHAELITE BROTHERHOOD.) The aim of the movement was a revolt from the 'grand style' and a return to simplicity and accuracy of observation. At first ridiculed, the style of the Pre-Raphaelites produced a host of popular imitators, and later a 'second' movement started in which the names of Sir Edward Burne-Jones (1833-98) (q.v.) and Wm Morris (1834-96) (q.v.) are linked. Millais later in life became a prominent figure in the academic art of the day. G. F. Watts (1817-1904) (q.v.), whose paintings expressed the moral fervour of his ideas, was also accounted one of the foremost painters of his day. He was also a notable portrait painter. Alfred Stevens (1818-75) (q.v.), known in his lifetime more as a sculptor and designer, is now also recognised as a painter of importance. With Millais and his imitators painting was degenerating into a method of storytelling. In pronounced reaction to this came the work of James McNeill Whistler (1834-1903) (q.v.), an Amer.-born artist

who brought to England the influence of Fr. aesthetic aims. His own work with its emphasis on form, colour, and tone affected the course of Eng. painting. Eng. Impressionism, deriving from Constable and Turner as much as from Fr. artists, found expression in the work of the members of the New Eng. Art Club, founded in 1886. Wilson Steer (1860-1942) (q.v.), Sir George Clausen (1852-1944) (q.v.), and Sir Charles Holmes (1868-1936) (q.v.) are three among the many notable names in this connection. They are celebrated particularly for their landscape work, while among portrait painters John Sargent (1856-1925) (q.v.), an Amer. who painted in England, and a romantic impressionist, combined psychological penetration with considerable technical skill. Also under the heading of Impressionism may be classed the work of two other distinguished painters—Walter Sickert (1860-1942) (q.v.) and Augustus John (q.v.). John is a great romantic artist who in his later work has been influenced by and shows affinity with the Fr. Post-Impressionists. Sir Frank Brangwyn (q.v.) gained world-wide fame as a decorative painter. The first Post-Impressionist exhibition in England was held in 1910, and the new sense of form and colour it brought is seen in the work of the Camden Town Group, notably Harold Gilman (1876-1919), also in Duncan Grant (1883-), Sir Matthew Smith (1879-), and others. The new ideas of the Continent were pressed into the service of those painters who wished to express their experience gained in the First World War. C. R. W. Nevinson, William Roberts, Henry Lamb, Stanley Spencer, Eric Kennington, and the brothers Paul and John Nash were not satisfied with representational art, whether romantic or naturalistic, but were intent on using their considerable descriptive powers to portray their moral apprehension of life. Wyndham Lewis was one of the few Eng. artists to be directly affected by the Cubist movement into which Post-Impressionism on the Continent developed. Many of Paul Nash's formal, structural paintings also show Cubist influence. He was the moving spirit among a number of artists who in 1933 formed themselves into a group, named 'Unit One', with the aim of making design a 'structural pursuit' and imagination the keynote of Eng. painting. The years between the two world wars produced a flourishing display of talent among Eng. artists, a development which the Second World War has enhanced rather than diminished. Apart from the artists mentioned above, there are numerous painters whose work has influenced the trend of modern Eng. art, and who deserve more detailed reference than can be given here. Among them are Charles Conder, Henry Tonks, Charles Shannon, Charles Ricketts, Glyn Philpot, J. B. Yeats, Sir W. Nicholson, Sir W. Rothenstein, Sir Wm Orpen, Mark Gertler, Christopher Wood, Ben Nicholson, and of a new generation Graham Sutherland, John Piper, Victor Pasmore and

Francis Bacon. To-day painters are divided between abstract tendencies and a form of realism which is to be traced to the great influence of Walter Sickert.

Architecture.—See ENGLISH ARCHITECTURE; LONDON, Architecture.

English Sculpture after the Renaissance.

—The conventional Gothic style in England disappeared under It. influences. Torrigiano introduced the Renaissance manner, as instanced by the tomb of Henry VII in Westminster Abbey. The Chapel of St John the Evangelist in the Abbey has been attributed to Nicholas Stone (1568-1647), the first really notable Eng. sculptor (q.v.). The monument to Sir George Holles in Westminster Abbey is authentic, as is also the statue of Donne in St Paul's Cathedral. These monuments show that Stone's treatment, if somewhat heavy, was essentially classic. Calus Gabriel Cibber, father of Colley Cibber, and a pupil of Stone, was the sculptor of the fountains and temples of Chatsworth, the famous home of the Devonshire family. Of the same (Baroque) period, too, was Grinling Gibbons (1648-1720) (q.v.), one of the famous names in Eng. sculpture, though perhaps better known for his inimitable wood carving. His figure work is exemplified in St Paul's Cathedral and other London churches, while the statue of James II in St James's Park is one of his best bronzes. Francis Bird (1667-1731) followed the ornate decorative style of Cibber, as in his statue of Queen Anne in St Paul's Churchyard; but by the beginning of the 19th cent. this style had yielded to pseudo-Gk purity which achieved little else but cold formalism. No sculptor of distinction emerges in this period, though John Flaxman (1755-1826) (q.v.), the sculptor of the Mansfield monument in Westminster Abbey, Sir Francis Chantrey (1781-1842) (q.v.), and Joseph Nollekens (q.v.), who executed many good busts, were all well-known. A really great figure in Eng. sculpture is Alfred Stevens (1818-75) (q.v.), some of whose work is not inferior to that of Brunelleschi. His outstanding achievement is the Duke of Wellington's monument in St Paul's Cathedral, but his decorative work in Dorchester House (now razed) was also brilliant, especially the magnificent fireplace in the dining-room, with its stooping figures of two females in support.

Eng. sculpture of the 20th cent. has been influenced by the 2 great Fr. sculptors, Rodin and Maillol. Their influence is seen particularly in 2 of the most distinguished of Eng. sculptors, Jacob Epstein (q.v.) and Frank Dobson (q.v.). Both these sculptors excel in portraiture, but Epstein, who ranks as one of the greatest of Eng. sculptors, is also known for his large allegorical stone figures. A school of modern sculpture devoted to the handling of abstract form has as its leading exponent Henry Moore, and with him may be associated Barbara Hepworth, John Skeaping, particularly in his early work, and Richard Bedford. Modern architecture gives less opportunity for the sculptor

than in former times. All the more outstanding therefore are the figures by Epstein and Eric Gill adorning the London



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EPSTEIN'S 'MAJESTAS'

This 16 ft. figure, representing 'Christ in Glory' is erected on the apex of a concrete parabolic arch in Llandaff Cathedral.

Transport Offices in Westminster and Broadcasting House, London, respectively, while mention should also be made of W. G. Simmonds, G. Bayes, G. Ledward, Alan Durst, Maurice Lambert, Sargent Jagger, the sculptor of the

Artillery Monument, Hyde Park Corner, London, Sir Alfred Gilbert, Charles Wheeler, and Sir W. Reid Dick. A new type of plastic art, linear, and relying on metal construction, among its practitioners being Reg Butler and Lynn Chadwick, has come into prominence in recent years. (See also SCULPTURE.)

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English Association, formed in 1906 to promote the knowledge and appreciation of the Eng. language and Eng. literature, and to uphold the standards of Eng. writing and speech. Membership is open to all, and there are numerous branches in the Commonwealth. London H.Q. are at 8 Cromwell Place, S.W.7.

English Channel (Fr. *La Manche*, the sleeve), dividing England from France. Its length is about 350 m., and the greatest breadth between Ushant and Land's End is about 110 m. The average depth is from 20 to 30 fathoms, reaching 60 fathoms at the entrance to the Strait of Dover and as much as 94 fathoms at Hurds Deep. The tides are peculiar, parts of the E. coast having a double tide, the effect generally being to cause higher tides on the Fr. coast than on the Eng. coast. W. winds are the most prevalent, gales occurring chiefly between Oct. and Jan., and fogs are common throughout the year. Regular shipping services are run between Southampton and St. Malo, Cherbourg, and Le Havre; between Newhaven and Dieppe; and also across the narrower Strait of Dover (q.v.). The prin. is. are the Channel Is. group and the Isle of Wight (qq.v.). See also CHANNEL TUNNEL.

English History. Within the last 30 years much archaeological evidence has been discovered relating to the inhab. of pre-Rom. England, going back as far as the Old Stone Age. About 1800 bc peoples from what is now France and Flanders estab. the culture which gave rise to the religious temples such as Stonehenge (q.v.); and by about 500 bc Celtic invaders had estab. a relatively advanced culture which has left a rich mass of archaeological evidence (see BRITAIN, ANCIENT).

In AD 43 the Rom. invasion of England under Claudius began, and this really marks the beginning of recorded E. H., though throughout the Rom. period the historian must rely very considerably on

the archaeological evidence to supplement the bare recorded facts (see BRITAIN, ROMAN HISTORY OF), and, even so, much of the hist. of England under the Romans remains obscure. It is clear that the Romans gave England over 300 years of relatively unbroken peace; before their occupation ended they had introduced Christianity, estab. centres of commerce and gov., built an orderly net-work of roads, and imposed their pattern of life on its native inhab. in varying degrees. But as the 4th cent. progressed Rom. power and influence in England began to decline, a fact emphasised by the archaeological evidence found in recent years. Some time between 417 and 429 the Romans finally abandoned the country, and for the next 150 years the hist. of England is extremely confused.

Even before the Romans left England there is evidence of sporadic coastal attacks by pirate bands of continental origin, as well as of Pictish incursions from the N. After the Rom. withdrawal these attacks became more frequent, and by the middle of the 5th cent. some of the attackers were beginning to establish permanent settlements in England. The Jutish kingdom of Kent was founded about 450; during the next 100 years waves of Germanic invaders gradually conquered virtually the whole of the country now known as England. Tradition lists these tribes of invaders as the Angles, Saxons, and Jutes, and modern historians are inclined to trace the continental origin of all 3 to NW. Germany although there remains some doubt about the Jutes, whose tribal organisation shows marked differences from the other two even in the early days of the settlements. Certainly they were subsequently much more susceptible to European influences, and it was through Kent that Rom. Christianity eventually regained its foothold in England.

The Britons were gradually driven back to the mts of the W., but for sev. years their resistance to the invaders was bitter and, on one occasion at least, effective and organised. Celtic sources of some 50 years later refer to a great warrior leader of the Britons, called Arthur (q.v.), who won sev. battles against the Saxons, inflicting a severe defeat on them at Mons Badonicus (c. 500 AD; the place has never been identified). This defeat apparently halted the invasion, but only temporarily. There must have been a considerable intermingling of the conquered and conquering races, but the positive evidence is slight. What is clear, however, is that the invaders imposed their way of life on the areas they settled in its entirety; their predecessors' language, customs, and religion were eliminated, and the Romans, half-abandoned even before the evacuation, fell into complete decay and in sev. cases were never re-settled.

At the end of the 8th cent. Britain can be divided into the following divs.: Northumbria, Mercia, East Anglia, Kent, and Wessex, with the Brit. Isers. Strathclyde, N. Wales, and W. Wales.

constant struggle went on between Northumbria and Strathclyde, Mercia and N. Wales, and Wessex and W. Wales.

The heathen Eng. tribes, before the end of the 6th cent., have left little definite evidence of their internal hist., and customs in Britain, and it is only after the conversion to Christianity, carried out in the S. principally by Augustine (597), and in the N. by the Celtic Church, whose apostle, St Aidan, did so much, that England's hist. assumes clearer outlines. England was not easily converted and the kings of Kent and Northumbria were for a long time opposed by the heathen king of Mercia. Once Christianity was definitely estab. in the major kingdoms, a constant struggle for supreme power in the country was waged between the various rulers, which was to continue until the rulers of Wessex finally became supreme in the 9th cent. In 663 was held the Synod of Whitby, which finally settled that the Eng. Church should follow the rule of Rome and not of Iona, a notable decision, for it linked England to the streams of continental thought and culture as little else could have done. In the meantime the power of Northumbria, which in the 7th cent. had been the leading Eng. kingdom, had waned, the battle of Nechtansmere had led to the annihilation of the Northumbrian armies, and Mercia under her kings, Ethelbald and Offa (q.v.), sprang into the foremost position. Under Offa Mercia actually took some part in the councils of Europe. Charlemagne recognised Offa's commanding position in England, and there began to be fairly constant intercourse between England and the Continent.

With the death of Offa, however, came the overthrow of Mercia, and Wessex soon assumed the hegemony. Egbert (q.v.) of Wessex may be regarded practically as the first real overlord of England. In turn he conquered or forced to submission all the great kingdoms, and by 825 he had at least laid the foundations of a united England.

The century which followed saw the beginning of the Dan. invasions on a large scale. They had made isolated pirate-raids in the past; now they came in greater numbers, content at first to plunder and retire, but later coming over definitely with a desire to settle in the country. They conquered Northumbria and East Anglia before they actually attacked Wessex. The early life of Alfred the Great (q.v.) was taken up in fighting them; but Alfred realised that it was impossible to drive them out entirely, and after the treaty of Wedmore (878) he divided England up into Wessex and the Danelaw (q.v.), and gave that portion of England, N. and E. of Watling Street, to the Danes, on condition of their adopting Christianity. But he also adopted the only real means of preventing fresh incursions by the Danes. He built a fleet which guarded the Channel and the E. coast, and which succeeded in defeating the Danes before they were able to land. By these means Alfred succeeded in

than in former times. All the more outstanding therefore are the figures by Epstein and Eric Gill adorning the London



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Transport Office in Westminster and Broadcasting House, London, respectively, while mention should also be made of W. G. Simmonds, G. Bayes, G. Ledward, Alan Durst, Maurice Lambert, Marven Jagger, the sculptor of the

Artillery Monument, Hyde Park Corner, London, Sir Alfred Gilbert, Charles Wheeler, and Sir W. Reid Dick. A new type of plastic art, linear, and relying on metal construction, among its practitioners being Reg Butler and Lynn Chadwick, has come into prominence in recent years. (See also SCULPTURE.)

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English Association, formed in 1906 to promote the knowledge and appreciation of the Eng. language and Eng. literature, and to uphold the standards of Eng. writing and speech. Membership is open to all, and there are numerous branches in the Commonwealth. London H.Q. are at 8 Cromwell Place, S.W.7.

English Channel (Fr. *La Manche*, the sleeve), dividing England from France. Its length is about 350 m., and the greatest breadth between Ushant and Land's End is about 110 m. The average depth is from 20 to 30 fathoms, reaching 60 fathoms at the entrance to the Strait of Dover and as much as 94 fathoms at Hurds Deep. The tides are peculiar, parts of the E. coast having a double tide, the effect generally being to cause higher tides on the Fr. coast than on the Eng. coast. W. winds are the most prevalent, gales occurring chiefly between Oct. and Jan., and fogs are common throughout the year. Regular shipping services are run between Southampton and St. Malo, Cherbourg, and Le Havre; between Newhaven and Dieppe; and also across the narrower Strait of Dover (q.v.). The prin. is. are the Channel Is. group and the Isle of Wight (q.v.). See also CHANNEL TUNNEL.

English History. Within the last 30 years much archaeological evidence has been discovered relating to the inhab. of pre-Rom. England, going back as far as the Old Stone Age. About 1800 BC peoples from what is now France and Flanders estab. the culture which gave rise to the religious temples such as Stonehenge (q.v.); and by about 500 BC Celtic invaders had estab. a relatively advanced culture which has left a rich mass of archaeological evidence (see BRITAIN, ANCIENT).

In AD 43 the Rom. invasion of England under Claudius began, and this really marks the beginning of recorded E. H., though throughout the Rom. period the historian must rely very considerably on

the archaeological evidence to supplement the bare recorded facts (see BRITAIN, ROMAN HISTORY OF), and, even so, much of the hist. of England under the Romans remains obscure. It is clear that the Romans gave England over 300 years of relatively unbroken peace; before their occupation ended they had introduced Christianity, estab. centres of commerce and gov., built an orderly net-work of roads, and imposed their pattern of life on its native inhab. in varying degrees. But as the 4th cent. progressed Rom. power and influence in England began to decline, a fact emphasised by the archaeological evidence found in recent years. Some time between 417 and 429 the Romans finally abandoned the country, and for the next 150 years the hist. of England is extremely confused.

Even before the Romans left England there is evidence of sporadic coastal attacks by pirate bands of continental origin, as well as of Pictish incursions from the N. After the Romans withdrew these attacks became more frequent, and by the middle of the 5th cent. some of the attackers were beginning to establish permanent settlements in England. The Jutish kingdom of Kent was founded about 450; during the next 100 years waves of Germanic invaders gradually conquered virtually the whole of the country now known as England. Tradition lists these tribes of invaders as the Angles, Saxons, and Jutes, and modern historians are inclined to trace the continental origin of all 3 to NW. Germany although there remains some doubt about the Jutes, whose tribal organisation shows marked differences from the other two even in the early days of the settlements. Certainly they were subsequently much more susceptible to European influences, and it was through Kent that Rom. Christianity eventually regained its foothold in England.

The Britons were gradually driven back to the mts of the W., but for sev. years their resistance to the invaders was bitter and, on one occasion at least, effective and organised. Celtic sources of some 50 years later refer to a great warrior leader of the Britons, called Arthur (q.v.), who won sev. battles against the Saxons, inflicting a severe defeat on them at Mons Badonicus (c. 500 AD; the place has never been identified). This defeat apparently halted the invasion, but only temporarily. There must have been a considerable intermingling of the conquered and conquering races, but the positive evidence is slight. What is clear, however, is that the invaders imposed their way of life on the areas they settled in its entirety; their predecessors' language, customs, and religion were eliminated, and the Romans, half-abandoned even before the evacuation, fell into complete decay and in sev. cases were never re-settled.

At the end of the 6th cent. Britain can be divided into the following divs.: Northumbria, Mercia, East Anglia, Kent, and Wessex, with the Brit. ters. of Strathclyde, N. Wales, and W. Wales. A

constant struggle went on between Northumbria and Strathclyde, Mercia and N. Wales, and Wessex and W. Wales.

The heathen Eng. tribes, before the end of the 6th cent., have left little definite evidence of their internal hist. and customs in Britain, and it is only after the conversion to Christianity, carried out in the S. principally by Augustine (597), and in the N. by the Celtic Church, whose apostle, St Aidan, did so much, that England's hist. assumes clearer outlines. England was not easily converted and the kings of Kent and Northumbria were for a long time opposed by the heathen king of Mercia. Once Christianity was definitely estab. in the major kingdoms, a constant struggle for supreme power in the country was waged between the various rulers, which was to continue until the rulers of Wessex finally became supreme in the 9th cent. In 663 was held the Synod of Whitby, which finally settled that the Eng. Church should follow the rule of Rome and not of Iona, a notable decision, for it linked England to the streams of continental thought and culture as little else could have done. In the meantime the power of Northumbria, which in the 7th cent. had been the leading Eng. kingdom, had waned, the battle of Nechtansmere had led to the annihilation of the Northumbrian armies, and Mercia under her kings, Ethelbald and Offa (q.v.), sprang into the foremost position. Under Offa Mercia actually took some part in the councils of Europe. Charlemagne recognised Offa's commanding position in England, and there began to be fairly constant intercourse between England and the Continent.

With the death of Offa, however, came the overthrow of Mercia, and Wessex soon assumed the hegemony. Egbert (q.v.) of Wessex may be regarded practically as the first real overlord of England. In turn he conquered or forced to submission all the great kingdoms, and by 825 he had at least laid the foundations of a united England.

The century which followed saw the beginning of the Dan. invasions on a large scale. They had made isolated pirate raids in the past; now they came in greater numbers, content at first to plunder and retire, but later coming over definitely with a desire to settle in the country. They conquered Northumbria and East Anglia before they actually attacked Wessex. The early life of Alfred the Great (q.v.) was taken up in fighting them; but Alfred realised that it was impossible to drive them out entirely, and after the treaty of Wedmore (878) he divided England up into Wessex and the Danelaw (q.v.), and gave that portion of England, N. and E. of Watling Street, to the Danes, on condition of their adopting Christianity. But he also adopted the only real means of preventing fresh incursions by the Danes. He built a fleet which guarded the Channel and the E. coast, and which succeeded in defeating the Danes before they were able to land. By these means Alfred succeeded in

keeping peace in the land during the greater part of his reign, and he was thus able to carry out a great number of internal reforms. But before the end of his reign the attacks of the Danes had again commenced and were continued during the reign of Edward the Elder (q.v.), who succeeded in establishing his supremacy over the Danelaw, and who, in 924, was recognised as the overlord of the whole of England, and whose authority seems to have been acknowledged by the Scots and the Welsh. In 978 Ethelred the Unready succeeded and during his reign the Danes struck again. Time after time the country was invaded. Ethelred, by means of large levies of Danegeld (q.v.), bought off the invaders for a time, but they returned only too ready to gain more money so easily, and finally in 1002 Ethelred caused the massacre of the Danes which called down on him the vengeance of Sweyn, and which helped to lead to the rule, from 1016 to 1042, of the Dan. kings. Ethelred died into exile in Normandy, an exile which had a great effect upon the ultimate hist. of England.

Canute (q.v.), the first and the best of the Dan. kings, ruled wisely and well. His 2 sons, Harold and Harthacnut, are notorious principally for their evil lives, and in 1042, on the death of Harthacnut, the old Saxon dynasty was restored in the person of Edward the Confessor (q.v.), the son of Ethelred. Edward was much more fitted to be priest than king, and during much of his reign the power lay in the hands of Godwin, earl of Wessex, and later of his son Harold (q.v.). Edward, who had no children, was largely Norman by training, and on his death Wm, duke of Normandy, declared that Edward had promised him the crown, and that Harold had in the past sworn an oath making himself Wm's vassal. Harold, however, was confirmed king of England by the witan, and took up arms in the defence of the kingdom. His brother, Tostig, deprived of his earldom of Northumbria, invaded England and fought together with Harold of Norway against Harold of England, at Stamford Bridge. The latter was victorious, and turned with his men to confront the Normans who had landed in the S. In Oct. 1066 was fought the battle of Hastings (q.v.), in which Harold perished, and on 25 Dec. of the same year Wm was crowned king of England.

The Norman conquest (q.v.) was the beginning of the final process in the welding of the Eng. nation into one compact body. The end was still a long way off. William I (q.v.) brought in his train numerous Normans, all of whom had to be rewarded by the king with Saxon lands. In general, therefore, the Saxons tended to sink to the bottom of the social scale, and for many years there was little fusion of the races. Wm was occupied for sev. years with the completion of the conquest of England, and when this had been done he turned his attention to the gov. of the country. He was not only a great warrior but also a great king. He

had seen limitations in feudalism on the Continent and he seems to have been determined to remedy, as far as possible, these defects, although many of his innovations to Eng. feudalism were probably unconscious. The estates of his followers were scattered throughout the length and breadth of the land. Further, by the Oath of Salisbury, tenants had to swear allegiance directly to the king, and finally the Domesday Book (q.v.), afforded him an unprecedented body of information, which made his grip on the country firmer and more easily maintained.

When Wm d. England and Normandy were temporarily separated but were reunited under his youngest son Henry I (q.v.). Henry I was the first of the Norman kings actively to encourage the fusion of the races, he himself marrying a princess of Saxon descent. In 1120 his only son Wm was drowned in the wreck of the *White Ship*, and the greater part of the rest of Henry's life was taken up in the attempt to get his daughter Maud recognised as the heir to the throne. Previous to his death in 1135 he had coerced the barons into promises to recognise Maud, but subsequently Stephen of Blois was acclaimed king.

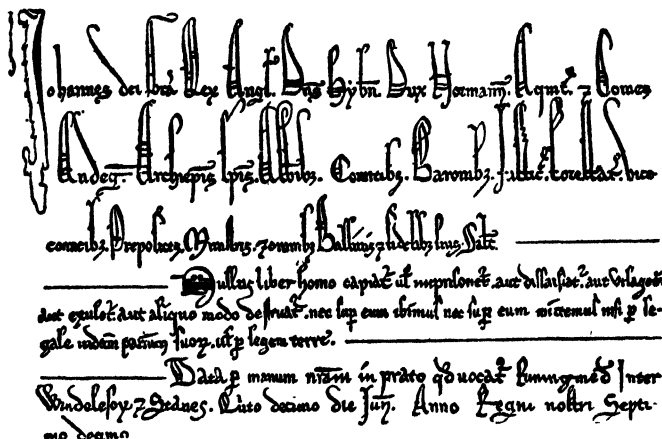
With the accession of Stephen (q.v.) in 1135, Civil war broke out and continued practically during the whole of his reign. The barons were able to exercise their power unchecked and the people, crushed between the forces of the king and of Queen Maud, suffered a great deal.

Finally, in 1153, the treaty of Wallingford was signed by Stephen and Henry, son of Maud. By the terms of this treaty, Stephen was to reign until his death, when he was to be succeeded by Henry. Henry II (q.v.) was one of the greatest kings of England. He ruled not only England, but Normandy, Maine, Anjou, Touraine, and Aquitaine. He was acknowledged overlord of Scotland, Ireland, and Wales; he practically ruled Brittany—in fact his dominions may be regarded as stretching from the Pyrenees to the Orkneys. He curbed the power of the baronage, and by judicious reforms he obtained the support of the people, but he failed when he attacked the Church. The point at which he had been aiming, the subordination of eccles. law to the Crown, failed when it had almost succeeded, by the murder of Becket (q.v.) in 1170. During his reign, Strongbow (Richard de Clare, earl of Pembroke, d. 1176) crossed over into Ireland and began the conquest of that country. The latter part of Henry II's reign was darkened by quarrels with his sons. His eldest son had died virtually fighting against him; Richard was a source of constant trouble, whilst John, the darling of his old age, was untrustworthy. The last days of the king were passed in a war with his arch-enemy, Philip Augustus of France, and with his sons, and in 1189, after being compelled to give in, he d.

He was succeeded by his son Richard (q.v.), who, however, spent the greater part

of his time out of England, either on crusade or in France, during which time his brother John plotted against him. Richard died in 1199 and was succeeded by John (q.v.). John had energy which he did not use and ability and intelligence which he usually misapplied, though his reign was probably not as catastrophic to the mass of his subjects as has often been suggested. The early years of his reign were occupied in a struggle for the Fr.

the powerful barons. Gradually he saw himself beset on every side; France threatened, the barons negotiated, the Church thundered. Eventually the barons resolved to force the king to issue a charter which would safeguard their liberties. After a struggle John at Runnymede, on 15 June 1215, signed the Magna Carta (q.v.) intending to keep it as little as he had kept most other oaths. Magna Carta was a document drawn up by the magnates



EXTRACTS FROM MAGNA CARTA

A translation of the Latin

John by the Grace of God, King of England, Lord of Ireland, Duke of Normandy and Aquitaine, and Earl of Anjou:

To the Archbishops, Bishops, Abbots, Earls, Barons, Justiciaries of the Forests, Sheriffs, Governors, Officers, and to all Bailiffs and other his faithful Subjects, Greeting.

No Freeman shall be taken, or imprisoned or disseised, or out-law'd or banish'd or any ways destroyed, nor will we pass upon him, or commit him to prison, unless by the legal judgment of his Peers, or by the law of the Land.

Given under our hand, in the Presence of the Witnesses above-named, and many others, in the Meadow, called Runnymede, between Wndeclesore and Stanes the 15th Day of June, in the 17th year of our Reign.

possessions. In 1204 the Château-Gallard was lost, and Normandy passed into the hands of the Fr. John did not give up hope, and struggled constantly against the Fr., forming league after league. He, however, soon found himself in difficulties at home. In 1205 the barons refused to fight for the recovery of Normandy; in the following year, in spite of the violent opposition of John, Stephen Langton (q.v.) was appointed archbishop of Canterbury. John refused to recognise him, and in 1208 England was laid under an interdict and later the king excommunicated. During this period John's extortions had alienated the sympathies of

with the prime object of confirming their own privileges: but it was to become one of the cornerstones of Eng. liberties. The signing of it reconciled a number of the barons, and John thereafter had more support. He attempted to punish the N. barons who had been chiefly responsible for the Charter, and they in turn invited the Dauphin Louis to England as king. War was still raging in 1216 when John died, leaving the throne to his son, Henry III, aged 9. The Charter was confirmed, the baronage reconciled, and Louis finally left the country (1217). From 1217-32 the land was ruled by Wm Marshall, and on his death by Hubert de

Burgh. In 1232, however, began the personal rule of Henry III (q.v.), a period which is noted for the domination of foreign favourites. Henry was a pious weakling, who had but little mind of his own, but who could on occasion be extremely obstinate. He was continually exacting money, and many expedients were attempted by the baronage to obtain control of the purse. The most outstanding personage of the reign was Simon de Montfort (q.v.) who came to England as a favourite of the king and remained to uphold the rights and privileges of the barons. In 1248 he was appointed governor of Gascony, and shortly afterwards was deprived of this post owing to complaints by the Gascons of his severity. He remained out of England until 1253, when he returned to place himself at the head of the baronage. In 1258 the king agreed to the Provisions of Oxford, but in 1264 civil war broke out between the barons, led by de Montfort, and the Royalists, whose prin. leader was Prince Edward. The Royalists were defeated at the battle of Lewes, and the king and prince became prisoners. Later in the year Prince Edward escaped, defeated the barons' army, now much weakened by desertion, and killed de Montfort. The remainder of the reign passed quietly, the chief power up to 1270 being in the hands of Prince Edward, who in that year departed to the E. on crusade. In 1272 Henry III died, and although it was two years before Edward returned to this country, there was no dispute over the succession.

Edward I (q.v.) was one of the greatest Eng. kings, and as a law-maker and organiser ranks with Henry II and Wm I. Part of his policy was to construct a united England and Scotland, and the Scottish war which raged practically from 1294 to 1307 was a result of this policy. He died in 1307, with the Scots in open rebellion, and just after Robert Bruce (q.v.) had been crowned king. Meanwhile Wales had been finally subjugated. Edward II (q.v.) succeeded his father, but his rule was influenced throughout by his favourites, Gaveston and the Despencers. During his reign the lords ordainers at one point took practically all the power from him, but again there was a reaction in his favour, and for a time he ruled with his favourites and with the support of the people. In 1314 he gathered the largest army which had ever been sent into Scotland, and attempted to relieve Stirling, then besieged by Bruce. He fought the battle of Bannockburn and met with the greatest defeat ever inflicted upon the Eng. by the Scots. In 1327 the conspiracy of the queen and her lover, Mortimer, caused him to be deposed, and in the following year he was murdered in Berkeley Castle. He was succeeded by his son Edward III (q.v.) who, in 1330, asserted his position and became sole ruler. The early part of his reign was taken up with a Scottish war, and then finally, in 1337, Edward claimed the throne of France in right of his mother. The claim

was largely a pretence, since Edward had previously recognised the king of France and done homage to him for Guienne. Edward's desire to attack France was based partly on economic and defensive reasons, but probably primarily dictated by personal ambition. (See HUNDRED YEARS WAR.) He attacked France from two points, through Guienne and from the N. In 1346 he won the battle of Crécy, and in the following year besieged and captured Calais. In 1346 Neville's Cross had been won, and the Scottish king taken prisoner. The Fr. war ceased in 1349 owing to the outbreak of the Black Death, a plague which helped very largely in the social revolution which followed. In 1356 the Black Prince won the battle of Poitiers. This was the last great victory of Edward's reign. The rest of his life was spent in dissoluteness and under the influence of Alice Perrers, his mistress. During his reign, however, unconscious strides were made in the constitutional gov. of the country, and the power of parliament increased rapidly. This was due to the fact that Edward, in order to wage war, was in constant need of supplies, and was prepared to grant certain privileges in order to obtain them. He died in 1377, preceded by his son the Black Prince. He was succeeded by his grandson, Richard II (q.v.). Richard had ability but succeeded to a crown already much weakened by the demands of the Fr. war. The period of his personal rule was tyrannical, and Henry Bolingbroke, returning from exile in 1399, was easily able to depose him. He was imprisoned and finally murdered in Pontefract Castle. During his reign Wycliffe (q.v.) the great religious reformer d., and just at the end of the reign Chaucer (q.v.), the first of the great Eng. poets, also d.

Bolingbroke, who succeeded as Henry IV (q.v.) was the eldest son of John of Gaunt, the third son of Edward III. He claimed the throne, not by conquest, but by parl. election, and was the founder of the House of Lancaster. Though he was never personally popular, he at least kept the country generally at peace. In 1403 Henry Percy, early of Northumberland, nicknamed 'Hotspur,' rebelled against him, and was supported by Owen Glendower both of whom were overthrown by Henry IV at the battle of Shrewsbury. Henry also persecuted the Lollards (q.v.), a name first given to those who adopted the new religious teaching of Wycliffe. Henry V (q.v.), who succeeded in 1413, renewed the war with France. In 1415 he achieved a notable victory at Agincourt. France was at this time divided into factions, and taking advantage of this fact, by judicious alliances Henry succeeded, in 1420, in forcing the Fr. king to sign the Treaty of Troyes, which gave Henry the Fr. king's daughter's hand in marriage, the regency of the country, and the ultimate succession to the throne of France. In 1422, just after the birth of his heir, he d. He was succeeded on the thrones of both France and England by his young son,

Henry VI (q.v.) for whom the regents, his uncles the dukes of Bedford and Gloucester administered the country. During the early part of the reign the Eng. still continued to win victories, but finally the Fr. settled their differences and after the appearance of Joan of Arc (q.v.) went from victory to victory, finally, in 1454, driving the Eng. out of everywhere save Calais. Meanwhile, the king had suffered lapses from sanity, and the supporters of the house of York began to claim the throne, alleging that their candidate, Richard, duke of York, was the more direct descendant of Edward III. In 1455 war broke out, and lasted up to 1471. The Yorkists were at first successful at St Albans, and the king fell a prisoner into their hands. In 1460 York was defeated and slain at Wakefield by Margaret of Anjou, but the earl of March, coming up from the W., entered London, was proclaimed king as Edward IV (q.v.) and marching N. defeated Margaret at Towton (1461).

For some time the country remained more or less at peace. Richard Neville, earl of Warwick (q.v.), and Salisbury, called the 'king-maker,' dictated the policy of the country. But the king flouted the great earl and drove him into the camp of the Lancastrians. Warwick landed from France and forced Edward into exile, proclaiming Henry VI again. Edward, however, returned unexpectedly from exile, defeated and killed Warwick at Barnet (1471), crushed the last hope of the Lancastrians at Tewkesbury three weeks later, and again estab. himself firmly as king. He ruled as a despot, and may be regarded as the first of the new monarchy. He was a patron of the new learning and of the art of printing—typically a prince of the Renaissance. He caused great jealousy by the promotion of some of his wife's relations; he d. in 1483. His son, Edward V (q.v.), succeeded him, to be murdered in the Tower of London after a two months' reign, probably by his uncle, Richard of Gloucester, who on the death of the prince and his brother caused himself to be proclaimed as Richard III (q.v.). He was personally brave but soon became unpopular, and gradually the rumour of the murder of the princes increased this unpopularity. A conspiracy was made against him by Henry Tudor, earl of Richmond, who came over from France, met Richard at Bosworth Field (1485), and there defeated and killed him, owing principally to the wholesale desertions of Richard by the nobles. Henry was crowned on the battlefield.

Henry VII (q.v.) was descended on his father's side from the Tudors, on his mother's from John of Gaunt, and was therefore hailed by the Lancastrians as the representative of their line. He claimed the throne by descent and by election, and finally put an end to the rival claims by marrying Elizabeth of York, the daughter of Edward IV, thus uniting the two lines. He crushed the remaining power of the baronage, and he

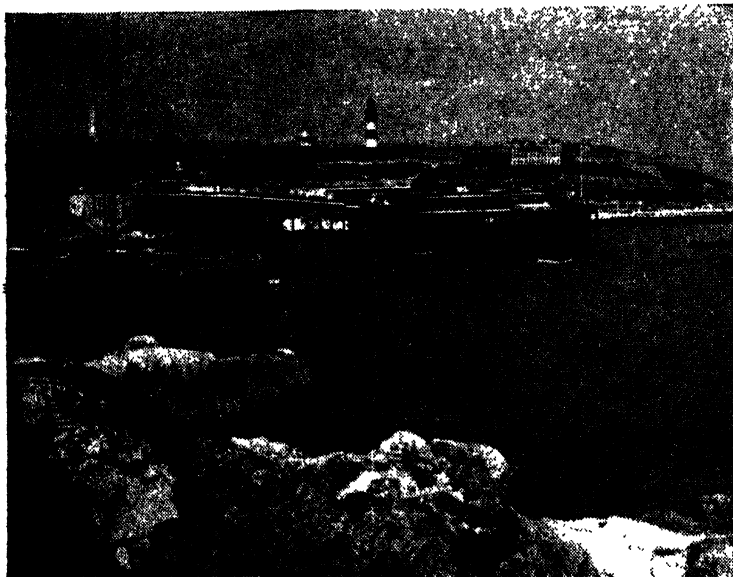
ruled despotically, but he restored commerce and raised England again to the rank of a European power. He was miserly, but to him the possession of money meant the possession of power. The attempts of Lambert Simnel and Perkin Warbeck were defeated, and Henry's position was strengthened by the marriage of his son to Catherine of Aragon, and his daughter to James IV of Scotland, both marriages of vital importance to England. He died in 1509, leaving Henry VIII (q.v.) with a secure hold on the throne and affection of the people.

The reign of Henry is notable chiefly for the separation of the Eng. Church from Rome. At the beginning of his reign there was some slight trouble with France and Scotland, the Scottish war being ended in 1513 by the battle of Flodden. Wolsey (q.v.), Henry's chief minister during the early part of his reign, remained firm to the policy of preserving the Balance of Power, the Emperor Charles V and the Fr. constantly bidding one against the other for the friendship of England. Henry's attitude towards the doctrines of the Church may be judged from the fact that he pub. a book against the teachings of Luther, and received from the pope the title 'Defender of the Faith.' By 1526, however, he had grown tired of his wife, Catherine of Aragon, and posed as having religious scruples as to the validity of the marriage. He demanded, through Wolsey, a decree of nullity from the pope, Clement VII. When the papal legate sent to England to hear the case adjourned the court to Rome, Henry dismissed Wolsey, and taking the advice of Cranmer (q.v.) and Thomas Cromwell (q.v.) he broke away from Rome and forced the Eng. Church to obey him as its supreme head. There was no change in doctrine save in a few minor points; nevertheless Henry was now head of the Church and not the pope. In order to have fuller control over the Church and to glut the greed of Henry and his supporters, the monasteries were dissolved. In 1536 the smaller ones went; in 1539 the larger monasteries suffered also. Their lands enriched the king and the nobility. These changes provoked abortive rebellions which were put down with great cruelty. During the later years of the reign a tendency towards Protestantism became more apparent in the country as a whole, but especially in London and the SE. In his old age Henry became merely a brutal tyrant; he d. in 1547, having married six times. By his will he had left the throne to Edward VI (q.v.) to be followed, if he d. without children, by Mary, daughter of Catherine of Aragon; she in turn to be followed by Elizabeth, daughter of Anne Boleyn. Edward VI was only 9 years of age when he succeeded; the country was ruled for him by the protectors, the dukes of Somerset and Northumberland. During this reign Protestantism first really gained a secure footing in the country. The churches were stripped of images, the Catholic service was stopped, and the first

Eng. Prayer Book was issued. In 1553 Edward VI *d.* He left a will which set aside that of his father and gave the throne to the Lady Jane Grey (q.v.). Mary, however, found no difficulty in obtaining recognition, and Northumberland, Dudley, his son, and the Lady Jane Grey were committed to the Tower and later beheaded.

Mary (q.v.) had always been a fervent Catholic; she now restored the Catholic religion, and for a time England reverted

men of ability cannot be denied, but much must be allowed to her own personality and genius. She tried to provide the Church of England with a 'via media,' a compromise of doctrine which should reconcile Catholic and Calvinist. Her great dangers, externally, came from Scotland and Spain. Scotland was disturbed by the religious quarrels, and, finally, Mary Queen of Scots (q.v.), Elizabeth's greatest rival, was driven a fugitive into England, where she remained



John H. Stone

PLYMOUTH HOE

to the papacy. She married Philip II, King of Spain, and this, together with the religious persecutions which took place, did much to make her unpopular. Further, the alliance with Spain involved a war with France, and during that war England lost her last Fr. possession, Calais. Amongst the heretics burned during this reign were Latimer, Ridley, and Cranmer. Mary *d.* in 1558; she was succeeded by her half-sister, Elizabeth I (q.v.). One of the most complex figures in Eng. hist., Elizabeth lived in a period when one false step would have meant ruin, or at least great national danger. She was beset on every side by enemies, and was regarded even by some of her own subjects as a usurper, and yet she managed to steer the ship of state safely for 45 years. That she was helped by circumstances there is no doubt, that her ministers were

a prisoner until her execution in 1587. The following year came the great Armada (q.v.). Eng. seamanship and the elements combined to wreck the hopes of Spain, and the pathetic remnants of the shattered Armada returned home, defeated. This was the crowning victory of Elizabeth's reign; no longer need she dread the power of Spain; England was at last one of the great powers.

The most significant feature of Elizabeth's reign is that series of events which may best be described as the Eng. Renaissance. The sea rovers plundered the Sp. Main, discovered new lands, and made a name for themselves throughout the world. In every dept of national life there were fresh developments. She *d.* in 1603 after a reign which will always be remembered as one of the greatest in the hist. of the Eng. nation. She was suc-

ceeded by James VI of Scotland and I (q.v.) of England. Thus the united Great Britain of Edward I was accomplished through the marriage schemes of Henry VII. The early events of the reign were the attempts to reconcile Puritanism within Anglicanism, which failed, and the Gunpowder Plot (q.v.) of 1605. During this reign can be found all the essential causes of the Civil war (q.v.) which broke out during the next reign: the mistaken foreign policy, the unpopularity of the king, the unjust taxation, and the desire to rule despotically, this time by divine right. It was in the struggle against Puritanism (both religious and political in character) that divine right and passive obedience were to be overthrown.

During the reign of James, the Thirty Years' War broke out in Europe, and the king tried to act for a time, unsuccessfully, as the arbiter of Europe. Charles I came to the throne in 1625. His reign can be described as one series of blunders, though, as the reign advanced, the faults were far from being exclusively on Charles's side. Parliament attacked his favourites, refused him supplies, and, finally, in 1628, forced the Petition of Right upon him. From 1629 to 1640 he ruled without a parliament. During this period occurred the ship-money cases, and continual breaches of the law. But it was on the rock of the Church in Scotland that Charles finally foundered. His attempts to imitate his father and force Episcopacy on the Scots roused anger in Scotland, the introduction of the Prayer Book of Laud led to open rebellion, and the first Bishops' War broke out (*see* SCOTLAND). The Short Parliament (1610) was summoned and dissolved within 3 weeks. Then followed the Long Parliament, which undid the work of the 11 years' tyranny, but which at the same time did much that was unconstitutional. Strafford (q.v.) was executed; Laud (q.v.) met with the same fate later. Ship-money was declared illegal, the Star Chamber abolished, and finally the king was forced to consent to the reading of the Grand Remonstrance. He then made his fatal mistake: he attempted to arrest 5 members, and failing, left London. Finally, in 1642, he raised his standard at Nottingham. At first the Royalists (q.v.) were successful, but later came the formation of the New Model Army, and the Royalist defeats at Marston Moor and Naseby. The king surrendered to the Scots, and was finally handed over to the Eng., by whom, after prolonged negotiations and the outbreak of the 2nd Civil war, he was executed (Jan. 1649).

For the next 11 years England was a commonwealth—for the first 4 years a rep., for the remaining 7 a protectorate. The execution of the king roused horror throughout Europe; Scotland and Ireland rose in revolt, and Charles II (q.v.) was crowned in Scotland, but the Scots were routed at Dunbar and Worcester, and the Irish at Wexford and Drogheda. For a short time England, Scotland, and

Ireland were united. In 1653 Oliver Cromwell (q.v.) became Protector, ultimately ruling as arbitrarily as Charles I had tried to do. His foreign policy was spirited and popular, and placed England high in the councils of Europe. In 1658 Cromwell *d.*, and there was chaos for a time in England. Richard Cromwell was inefficient, and finally Monk, marching from Scotland with the army, declared in favour of a free parliament which restored Charles II.

The Restoration (q.v.) was hailed with enthusiasm by the vast majority of the nation. The sombreness of the Puritan era had sickened them, and was also partly responsible for the excesses of Charles II's reign. The reign of Charles is marked by a reaction from the dreary morality of Puritanism; Charles himself ruled with great skill, though entirely unscrupulously, trusting in secret Fr. subsidies and his personal popularity to keep him independent of parliament. In some ways it was a period of national disaster and shame; the guns of the Dutch were heard on the Thames from the City of London. In 1665 the Great Plague broke out and in the following year the Great Fire destroyed London. The Popish Plot, fabricated by Titus Oates, led to the introduction of the Exclusion Bill, and the Petitioners and Abhorers formed the nucleus of the Whigs (q.v.) and Tories (q.v.) of the following century. But Charles succeeded in his prin. aims: to keep his throne, and to keep internal peace, and the latter years of his reign were years of personal triumph. He *d.* in 1685, witty and cynical to the end. James II (q.v.), who succeeded him, inherited far more of the faults of his father, Charles I. His obstinacy led him into difficulties which his brother would have avoided, and his open avowal of the Catholic faith, whilst it did not at first alienate the majority of his subjects, prepared the way for the Revolution. James openly attempted to restore freedom for the Catholic faith. Catholics were introduced into the army and the univs., the penal laws against them were dispensed with, and the king finally issued a Declaration of Indulgence (1687). Seven bishops petitioned against this, but they were imprisoned and tried for seditious libel. They were acquitted amidst the applause of the people. At the same time an heir was born to James, and this made speedy Protestant action necessary. Hitherto the next heir to the throne had been Mary, his daughter, a Protestant, and the wife of William of Orange. Now it was certain that the new heir would be educ. in the Catholic faith. Messengers were despatched to William of Orange. Wm landed at Brixham; before the end of the year he was in London, and by that time James had fled, had been recaptured, and permitted to escape again. Wm III (q.v.) and Mary (q.v.) signed the Declaration of Right and were declared joint sovereigns, whilst Catholics or any who should marry a Catholic were barred from succession to the Eng. throne. The

actual Revolution had been bloodless, though it was really the culmination of the 6 years' Civil war which had ended in the execution of Charles I. Rebellions broke out in Scotland and Ireland, but were speedily crushed. In 1692 the Massacre of Glencoe took place, and Ireland, after the treaty of Limerick, was to give no more trouble until the end of the century.

England in the meantime engaged with Holland in the war of the Protestant Succession against Louis XIV, terminated by the treaty of Ryswick in 1697. Both sides, however, now prepared for the greater struggle which they saw must come. The question of the Sp. Succession must soon be settled, and both Wm and Louis were interested in that settlement (see SPAIN—History). The Partition Treaties were drawn up and agreed to, but finally Louis accepted the will of the Sp. king which left Spain to the Fr. king's grandson, and England and France again prepared for war. But even now the Eng. were not prepared to go to war on the point of the Sp. Succession—only when Louis made the second of his great blunders. James II d., and he acknowledged the Old Pretender as James III. England immediately clamoured for war, and during the preparations Wm III d. (1702). He had already been preceded by Mary, who d. 1694, and since they had no children was succeeded by Anne (q.v.), the 2nd daughter of James II.

The war of the Sp. Succession broke out at the beginning of the reign. It was fought in order to preserve the Balance of Power in Europe and prevent France from dominating the whole of the Continent. John Churchill, duke of Marlborough (q.v.), the Eng. commander, won the victories of Blenheim (1704), Ramillies (1706), Oudenarde (1708), Malplaquet (1709). Gibraltar was captured by the allies and Louis was forced to acknowledge defeat, but the allies pressed terms too heavily upon him and he made another desperate effort to free himself, succeeding certainly in mitigating the terms imposed on him. Meanwhile at home the Tories had become powerful and were desirous of peace, and so in 1713 was signed the treaty of Utrecht, which gave England the beginning of her colonial empire.

In 1707 the Act of Union between England and Scotland had been passed and had come into force (see SCOTLAND—History), and towards the end of the reign the question of succession had to be settled. The last child of Anne had d. in 1700, and the Act of Settlement had vested the crown in the nearest Protestant heirs of Sophia, electress of Hanover, and her descendants. But the Tory ministers, Bolingbroke and Harley, plotted the restoration of the Stuarts, and it was well known that the queen favoured the restoration of her half-brother, but the sudden death of the queen and the swift measures adopted by the Whigs prevented any serious steps from being taken, and in 1714, on the death of Anne, George I (q.v.).

was proclaimed without resistance. The Act of Union of 1707 had made England and Scotland one under the name of Great Britain, and from the accession of George I the hist. of both countries is treated under the heading GREAT BRITAIN. (For more detailed accounts of the reigns referred to in the above resumé, see under separate articles of the individual events, monarchs, and statesmen, etc.)

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English Horn, see COR ANGLAIN.

English Language, member of the W. Germanic branch of the Teutonic or Germanic div. of the great Aryan or Indo-European family of languages, to which family belong also the classical and romance tongues. The Germanic group divides into 3 smaller groups: the E. Germanic, of which the Gothic is the only literary representative; the N. Germanic, to which belong the Swedish, Norse, and Icelandic; the W. Germanic, to which belong High German, Old Saxon, Frisian, and all the dialects of O.E. There were originally no great differences of vocabulary and syntax between these groups.

The original inhab. of England were Celts, but during the first centuries of our era the land was conquered and occupied by the Romans. After their departure the Picts and Scots so harassed the helpless Britons that they are traditionally credited with having called in the aid of heathen tribes from N. Germany (see also

ENGLAND). Bede tells us that they were 'from three powerful German peoples, the Saxons, Angles, and Jutes,' that the Saxons came from what was called Old Saxony in his day; and that the Angles came from a country which bore their name, and lay between the land of the Saxons and that of the Jutes. He says in effect that the Jutes settled in Kent, the Isle of Wight, and S. Hants; the Saxons in Essex, Sussex, and Wessex; the Angles in the Midlands and along the N. and E. coastline. It was probably only after the settlement that the speech of these people developed characteristic differences in dialect.

The development of Eng. is divided into 3 periods: *Old English* (O.E.) from the beginnings, usually placed at the year AD 700, until 1100. *Middle English* (M.E.) dates from 1100 to 1500, and *New or Modern English* (Mod. E.) from 1500 to the present day. O.E. is also known as A.-S., but it is important to notice that its writers themselves always spoke of their language as 'Englisc.' Since the hist. of the language is perfectly continuous, there is little reason to give it a different name at different stages of its development. There is, of course, no clear div. between O.E. and M.E., or between M.E. and Mod. E. The transition is gradual, but so great that the 'Englisc' of Alfred would be unintelligible to a man of the present day.

1. *Old English* is divided into 4 dialects: (1) *Northumbrian* and (2) *Mercian*, which are grouped together under the name *Anglum*; (3) *West Saxon*, and (4) *Kentish*. Northumbrian was spoken from the Humber to the Lowlands of Scotland; Mercian from the Humber southward to Essex and the Thames. W. Saxon from Kent westward. The 2 Anglian dialects were very similar, but what has survived is insufficient to allow us to differentiate between them. The most valuable remains of the Kentish dialect are some charters concerning the disposal of property; and since charters are things which no one would copy, it is certain that we possess them in the original form, showing the exact dialect of the dist. where the charter was made. The first dialect to rise to literary prominence was the Northumbrian, and during the early O.E. period the Northumbrian schools were the most learned in Christendom. From them came Alcuin (AD 735), confidant and adviser of Charlemagne. It is probable that poetry and prose in the vernacular was written in Northumbria at this time, but all, with the exception of a few fragments, such as a riddle, Bede's death-song, some glosses, and Caedmon's Hymn, preserved in the vernacula in some MSS. of Bede's *Ecclesiastical History*, 731, have perished. The invasions of the Danes during the 8th and 9th cents. destroyed the Northumbrian culture. A new literature arose in the S. under the guidance of Alfred, and a large number of the works produced in the following period are extant in transcripts. Thus, most of our knowledge of O.E. rests

upon W. Saxon, and this dialect is regarded as the norm, and all the others as variations from it.

O.E. was a synthetic language, that is to say, it expressed case, tense, and mood by inflection rather than by prepositions or auxiliaries. Nouns had five cases, nominative, accusative, genitive, dative, and instrumental. There were two declensions, strong and weak. Much levelling went on among the declensions of the strong nouns, so that the separate 5 strong declensions are not easily distinguishable. The masculine word *dōm* (judgment) will show the typical form: *sing.*, nom. and acc. *dōm*, gen. *dōmes*, dat. *dōm*; *plur.*, nom. and acc. *dōmas*, gen. *dōmg*, dat. *dōmum*; neuters of these declensions with a short stem vowel add *u* in the nom. and acc. plural. The strong feminine ends in a consonant or *u*, and is declined thus: *sing.*, nom. and acc. *giefu* (gift), gen. and dat. *giefe*; *plur.*, nom. and acc. *giefæ* (or *giefe*) gen. *giefena* or *giefæ*, dat. *giefum*. The weak declension nouns make their oblique cases in the singular by adding *-i*; the plural forms are (of the noun *nama*, a name), nom. and acc. *naman*, gen. *namena*, dat. *namum*. A certain number of nouns, such as *bōc*, *fæder*, *mann*, are declined in special ways, and are generally grouped together as consonant stems. The grammatical gender of O.E. is not necessarily connected with the natural gender. Thus, as we have seen, the noun *dōm* is masc. and *giefu* is fem., similarly we have *dæg* (day), masc., and *ār* (honour) fem. As in Modern Ger., *child* (child) was neuter, as also was *wif*, (woman). Adjectives were inflected according to both strong and weak declensions, and had separate forms for each of the genders. The weak form of the adjective was used in particular positions, of which the most common is after the definite article. If the noun had the article in front of the qualifying adjective, the adjective was weak; without the article, the adjective was strong. The definite article had also its three genders, masc. *se*, fem. *seo*, neut. *þæt*; it was used as a demonstrative as well as an article. The verbs, as in Modern Eng., were both strong and weak. The strong verbs made their past tense by an internal vowel change, and their past participle by the addition of *-en* and, by vowel change. The vowel in the preterite plural and second sing. differed from that in the rest of the singular. The parts of an O.E. verb which are useful to know are thus the infinitive, the first person singular of the preterite, the first person plural preterite, and the past participle, and these four are known as the 'principal parts' of the verb. The following prin. parts of a few verbs show the method of variation: *drifan* (to drive), *drif*, *drifon*, *drifen*; *bidðan* (to pray), *bied*, *bædon*, *beden*; *cēosan* (to choose), *cēas*, *curon*, *coren*. Weak verbs did not vary the preterite vowel, and so the plural preterite is not given as a 'principal part.' They formed their preterites either in *-(e)de* or *-(e)ode*, and their past participles either in *-ed* or *-od*. Thus, we have

lufan (to love), *lufode*, *gelufod*; *hieran* (to hear, obey), *hierde gehiered*. Some few weak verbs have also a change of vowel, thus, *þencan* (to think) *þohite*, *geþohit*. The O.E. verb had only two proper tenses, the present and the preterite, the former of these being normally used to express future as well as present time. The use of the auxiliaries (*wille*, *hæfde*, etc.) is early seen, though it does not become common until towards the end of the O.E. period. The order of words is less fixed than in Mod. Eng., on account of the abundance of inflections. The general order closely resembles that of Modern Ger., Not only was the grammar and syntax of O.E. purely Teutonic, but its vocabulary also was practically pure. Cognates of the words found in our old texts, are found in Gothic, Old Norse, Icelandic, Old High Ger., Old Saxon, etc., and the development of the science of philology in recent years has made the relations between them comparatively clear. The regularity of these relations was broken when foreign words were introduced into Eng. A certain number of words borrowed from Lat. are found in O.E. documents. As would be expected, these relate to eccles. services, ornaments, and practices for which no Germanic word existed. A few others were brought over by the Saxons from the Continent, having been borrowed in earlier intercourse with the Romans. Such a word is *stræt* (street).

A word must be said as to the spelling and pronunciation of the early Eng. and their scribes. The Germanic tribes used a method of writing magical formulae and short inscriptions called 'runes'; the runic alphabet consisted of twenty-four letters shaped for cutting easily on wood or stone. This alphabet was used at an early date in N. England for inscriptions on crosses, but it was entirely unsuitable for any kind of continuous writing in MSS. The introduction of the Lat. alphabet came with the Christianising of the country, being brought in slightly differing forms by the missionaries both from Ireland and from Rome. The Celtic form was generally adopted, with certain modifications from the Runic alphabet. From this the Runic letter for *w*, *p* (called 'wynn'), was used to replace the Lat. *u* (*v*). The sign *þ* (called 'thorn') was also taken to signify the voiceless *th* as in 'thin'; and in order to denote the voiced *th* as in 'there,' a crossed *d* was used in the form *ð*. These two signs came to be confused at an early date, and there is no clear distinction between them in existing MSS. But their origin shows the attempt to render the spelling phonetic, an aim which was attempted with a greater or less degree of success until the invention of printing caused the gradual fixing of the spelling. During the O.E. period, however, we may regard the spelling as phonetic, except for a few defects, one of which, the lack of distinction between hard and soft *th*, has been already mentioned. Moreover, *f* had to do duty for both the voiced and the voiceless sounds, being pronounced voiceless except be-

tween two vowels. The letter *y* had the sound of Ger. *ü*, while initial *c* was often pronounced *ch*. The letter *g* was often soft when it commenced a word and in certain other cases, *i* has been substituted for it. Thus *iung* and *geong* are both forms of the word for young. The combination *cg* as in *lrycg* (back) is pronounced as *dg* (in *bridge*). Medial *h* was a guttural sound, similar to the Modern Scot. *ch* in *loch*. Double consonants were not slurred as in N.E., but each was given its full value.

2. *Middle English*.—Though it is true that the Norman Conquest accelerated the decay of the O.E. grammar and syntax, yet it was not the cause of this decay. The action had set in a good many years before, and for a long while the Fr. court had very little influence on the native language. Layamon's *Brut* shows surprisingly few borrowings from Norman Fr., and this is indicative of the general state of affairs. The loss of its synthetic character weakened the syntax of the language, for the rigid order of an analytic language had not yet been made, and frequent ambiguity results. The best monument of this transition period is the entry for the year 1137 dealing with the reign of Stephen, in the *Anglo-Saxon Chronicle*. In the M.E. period the dialects are found somewhat differently distributed, and so receive different names. (1) The *Northern* corresponds roughly to the old Northumbrian, and still includes Lowland Scot., of which language in its modern form it is the ancestor. (2) The *Midland*, roughly equivalent to the old Mercian, is divided again into E. and W. Midland, sometimes with further subdivisions into N. and S.E. Midland, N. and S.W. Midland. (3) *Southern*, the descendant of the old W. Saxon, with an admixture of Mercian. The dialects of the W. country, as shown, for example, in W. Barnes's *Dorsetshire Farmer* show this dialect at a later stage. (4) *Kentish*, which, from its proximity to London, and the fact that both Chaucer and Caxton were Kentish men, has had a considerable influence on the development of the language.

But this div., though it probably accords with the facts in a general way, does not carry us very far when we come to an examination of M.E. MSS. Nor is it quite so complete and satisfactory a div. as was the O.E. one. In O.E. there was a standard literary W. Saxon dialect, and the MSS. which we possess show considerable agreement in their spelling systems and pronunciation. This is not so in M.E. Almost every dist. may be said to have developed its dialect as earlier forms died out, and the survival of a literary language was impossible during the period of Fr. dominance. Another difficulty then arose for the scribes. Most of them were educ. in the writings of the centuries past, and here they found a system of spelling which did not adequately represent the changed sounds of the new era. Many of them, by copying the old texts, introduced an arbitrary spelling into Eng. Hence begins the

commencement of the decay of the old phonetic spelling. This will, perhaps, be the best place to speak of a curious spelling experiment which was made by a writer of the name of Orm or Ormin. He wrote a lengthy metrical version of the Gospel known as the *Ormulum*, in which he employed an elaborate orthographic system to indicate the quantity of vowels and syllables. It relies largely on the doubling of consonants, but there are also other devices, such as 2 or 3 strokes over a vowel. Orm charged all his scribes to retain his forms intact; but there is no trace of any other writer having adopted his scheme. From the end of the 8th cent. onwards the N. and E. of the country was invaded by Vikings from Scandinavia, and in the years following the great Dan. invasion of 866 they almost conquered the whole country, but were finally driven out of the S. by the military genius of King Alfred. In his reign and for many years subsequently, the N.E. half of the country was in the hands of the Scandinavians whose language closely resembled the Anglian dialect, differing from it chiefly in its inflections. The result of intercourse between Anglians and Danes is, therefore, easy to see. The stems of the words became important, the inflections were useless, and hence the process of getting rid of them went on fastest in the N. Later M.E. pieces in N. dialect, such as the *Cursor Mundi*, are characterised by a surprising modernity, for not only have the inflections almost all disappeared, but the syntax shows many modern characteristics. A N. MS. of the beginning of the 13th cent. is easier than Chaucer for a modern reader to understand. The S. dialect is the least modern of the 3, and the most difficult to read. The Midland dialect is the ancestor of Mod. E. This is accounted for by its position; since it lay between the N. and S. dialects it was the means of communication between them. Moreover, both the univs. of Oxford and Cambridge lay within the Midland area. Most important of all was the fact that it contained London, already the great metropolis of the kingdom. Here the Midland dialect was spoken and intercourse between people speaking all kinds of dialects led to much levelling. It is this London dialect that forms the source of Chaucer's 'English' undeffled. But though the basis of Mod. E. is Midland, many words, spellings, and pronunciations were borrowed from the other dialects. The most important borrowings were made from Scandinavia. We have already mentioned something of the influence of the Scandinavian invasions on the N. dialect in hastening its inflectional disintegration. The influence is also seen in vocabulary. Many of the commonest and most useful Eng. words were borrowed at this period. Among pronouns, both *she* and *they* are Scandinavian, the original Eng. forms being *heo* and *hi*. In the S. these forms survive almost to the end of the M.E. period. *Egg* is another example of borrowing, for the Eng. form,

frequent in M.E. is *ei* (plural *eyren*). It is not easy for the novice to recognise the dialect of a M.E. text. The chief reason for this is the frequent copying of MSS. A scribe copied them or wrote them from dictation in the dialect to which he was himself accustomed, and if this dialect was different from that of the original MS., some confusion resulted. Since this process of copying occurred not once but many times in the case of popular poems, such as *Havelok*, rhyme is a good test, but even this is rendered uncertain by the fact that the poet himself might well have used a form from another dialect in order to effect rhyme.

We have said that the influence of the Norman Conquest on vocabulary worked but slowly. Its influence on the spelling, however, very soon took effect, as all writing was in the hands either of the Normans or of those trained by them. It will be as well to mention one or two of the changes thus brought about: (1) *ou* was written for O.E. *ū*, as for example, in mouse for O.E. *mūs*, house for O.E. *hūs*; (2) *qu-* replaced O.E. *cw-*, e.g. *queen* for *cuēn*; (3) in many words where confusion was likely to occur in writing on account of the number of down strokes, *o* replaced *u*, e.g. *comen* for O.E. *cuman*; (4) *w* and *th* replaced *p* (wynn) and *þ*; *k* also became more common; (5) O.E. *y* was written *u*, e.g. *synne* (c) appears as *sunne*. This becomes a characteristic feature of the S. dialect. In inflection the chief change from O.E. to M.E. is in the direction of simplification. All the O.E. diphthongs disappeared, and all vowels in unaccented syllables tended to level as *e*. *M* in inflectional syllables also became *n*. Thus *an*, *on*, and *um* all appear as *en*. There was also a regular series of vowel changes and lengthenings. Only one or two can be mentioned here; S. of the Humber O.E. long *ā* became *ō*, pronounced as the *au* in *aught*. Thus *slān* became *stōn*. In the N. dialect alone does the original *a* remain, and its pronunciation of *stone* as *stane*, etc., is still one of its characteristics. In all but the S., O.E. *ī* (= Ger. *i*) coalesced with original *i*. New diphthongs were formed by the union of vowels with the guttural *ɣ* (*g*) or *h*. Thus O.E. *dæg* becomes *dai* or *day*, but plural *dagas* generally appears as *dawes*. O.E. *weg* becomes *wet* (= way), *fægn* becomes *fain*, and so on. Initial *g*, probably soft even in O.E., became *y*, as in *yard*, *young*, *youth*, from O.E. *geard*, *geong*, *gioguð*. Initial *h* followed by another consonant was generally dropped, as in *ring*, *lauerd* (lord), from *hring* and *hlaford*. In the combination *hw*, however, metathesis takes place, though the original pronunciation generally remains. The verbs simplified considerably, and in M.E. the pres. plur. indicative ending forms a useful dialect test. Here the S. had the old *-ap*, Midland has *-en* and N. *-es* or no inflection at all. Cases almost entirely disappear, the genitive singular being the only one which retains its original inflection. The word order gradually becomes fixed as this process goes on.

3. *Modern English*.—About a hundred years after the London dialect had first been raised to literary eminence by the poet Chaucer, its orthography was finally cast into a mould by Caxton, who about 1477 introduced printing into England. Some trimming would be needed in the century and a half that was to follow, but in no material point does the grammar of Caxton differ from that of 20th-cent. Eng., and his spelling is still easily intelligible. The following are the most important of the few grammatical differences: (1) The use of the plural *-eth*; (2) the infinitive ending *-en*, also found sometimes in the plural; (3) occasional retention of imperative plural in *-eth*; (4) genitive singular in *-es* and *-is*. Spelling was very variable, and with the revival of learning many men attempted to re-spell old words according to their real or supposed etymology. *Subtle* had the *b* inserted on account of its derivation from Lat. *subtilis*. The *b*, however, had never been pronounced since the derivation was through the Fr. *sutl*. An example of mistaken etymology is seen in the word *rime* (from O.E. *rim*), which was misapprehended on account of its supposed connection with Gk. *rhuthmos*, rhythm. The spellings *ea* and *ee* denoted different sounds, *ea* as in *sea* represented the open *e* sound (pronounced somewhat as *a* in *mate*), while *ee* denoted the closed *e*. The difference is still shown by an Irishman. The open *ø* (as in *ought*) was frequently written *oa*, and in one word, *broad*, the Elizabethan pronunciation is retained. An *e* as in *stone* was added to denote a long vowel, while the doubling of a consonant, e.g. *penny*, showed a preceding short vowel. Thus a standard orthography was attained; and the first folio ed. of Shakespeare's works (1623) can be read quite easily by one almost destitute of training. But we should comprehend little if their author were to read them to us, for the pronunciation has undergone a series of gradual changes which in sum amounts to a revolution. This revolution has resulted in our vowel system being a European curiosity, while in Shakespearean times it was in accord with that of the Continent. Thus *a* was pronounced as in *father*, and except at court, where it had its present sound, the *d* was pronounced as in German. Long *e*, usually written *ea*, *ee*, or *ie*, was pronounced as *a* in *mate*. In some cases, such as *head* and *feather*, shortening has since taken place. There has been no considerable change in *è*. Long *i* was then pronounced as *ee* in *meet*, but has since diphthongised into *ai*, but *i* has remained constant, as has also *ó*. Long *ò*, as we have seen, was pronounced as in *broad*, and this sound later became represented by *au* or *aw* as in *saw*. Short *u* was pronounced as in Mod. E. *put*. Long *û* was pronounced in the Continental manner, and has since diphthongised into *fu*. Gutturals still proved a fertile source of diversity in pronunciation and spelling, and hence the famous diversity in Mod. E. between the various pronunciations of *-ough*. In the 18th cent. drama

we frequently find *through* pronounced *thrus*, and dialectal *enew* may still be heard for enough. Generally speaking, it may be said that the guttural either disappeared or turned into *f*. This shows briefly the chief changes in the vowel system of Mod. E., though it is impossible to show here the steps by which it took place. It is not by any means to be supposed that there was any sudden and conscious change. The greatest point, however, in which the Eng. of our own century differs from that of Caxton is in its vocabulary. M.E. was still comparatively a pure language, but since the invention of printing there has been a steady influx of words borrowed from all parts of the globe. Borrowings from Lat. had been made even before the arrival of the Eng. in the land. Fr. borrowings were frequent during the M.E. period, as were also incorporations from the Scandinavian tongue. The Renaissance saw an immense number of borrowings from Greek, and more especially Lat., and vast numbers of these were never incorporated into the language. Many, indeed, of the Elizabethans definitely aimed at the Latinising of their vocabulary. Fr. again gave us many words during the Restoration period, and here again a perusal of such writers as Dryden will show us that only a proportion of the borrowings became naturalised. At other times we have borrowed from Dutch, Italian, Portuguese, Turkish, Chinese, and in fact from almost every language with which we have come in contact. In general, it will be found that the borrowings from these languages can be variously classified. Thus Greek, from its clearness and accuracy of thought, has been called on to supply mathematical and scientific terms. The Dutch, once a great naval power, supply nautical terms and sev. for painting. Italy supplies musical terms. It will generally be found that our borrowings from Asiatic languages were the names of articles for which we had no Eng. equivalent, such as *junk*, *bungalow*, etc. The extent of our borrowings from the classical languages has given the Eng. language a large number of doublets; and these, assuming slightly different meanings, add greatly to the richness of the language, so much so, indeed, that its varying shades and tones can be adequately expressed in no other language.

Eng. is spoken as mother-tongue by about 200 million people in the Commonwealth and the U.S.A., and as a second language by at least as many, especially in the E. (India, China, Japan). Outside England, the sounds and vocabulary are more or less altered especially in Scotland, Ireland, U.S.A.; and in China (Pidgin Eng.). Deriving as it does from many tongues, it is the most international language, and in a selected vocabulary such as offered in Basic Eng. (q.v.) its use may spread even further as an auxiliary language. See also SAXON LANGUAGE AND LITERATURE; AMERICANISM.

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English Literature. For more detailed information reference must be made to the entries on individual authors, and to the separate articles on different branches or aspects of L., including: ALLEGORY; ANTHOLOGY; BALLAD; BIOGRAPHY; BURLESQUE; CHILDREN'S BOOKS; DETECTIVE STORY; DICTIONARY; DIDACTIC POETRY; DRAMA; ELEGY; EPIC; ESSAY; HISTORY; IMAGISM; LETTERS; LITERARY CRITICISM; LYRIC; MEMOIRS; MIRACLE PLAY; MOCK-HEROIC POETRY; NOVEL; NURSERY RHYME; ODE; PAMPHLET; PARODY; PASTORAL POETRY; POETRY; PROSE; RHETORIC; ROMANTIC MOVEMENT; SATIRE; SCIENCE FICTION; SHORT STORY; SONNET; VERSE.

For Ls of other E.-speaking countries and for associated Ls see AMERICAN LITERATURE; AUSTRALIAN LITERATURE; CANADIAN LITERATURE; FRENCH CANADIAN LITERATURE; IRISH LANGUAGE AND LITERATURE; NEW ZEALAND, *Literature*; SCOTLAND, *Literature*; SCOTTISH GAELIC LANGUAGE AND LITERATURE; SOUTH AFRICA, *Literature*.

E. L. begins, naturally, with the invasion of the country by A.-S. tribes after the withdrawal of the Romans. From then till the Norman conquest, roughly from 500 to 1100, is known as the O.E. period. Two points are apt to be overlooked in connection with this age. In the first place, it lasted 6 centuries, a very considerable time, about equivalent to the duration of modern E. L. from Chaucer to the present day. In the second, though the language is unintelligible to modern readers who have not studied it, it was by no means the product of a barbarous or primitive culture. E. civilisation was among the first to develop after the fall of the Roman empire. In the 10th cent. epic of *Beowulf* it possessed the earliest considerable poem in any modern language, and the *Anglo-Saxon Chronicle*, 9th-12th cent., was the first vernacular hist. of any W. nation. The school of Northumbria, to which the Venerable Bede (c. 627-735) belonged, was famous all over Europe, and one of its scholars, Alcuin, became Charlemagne's minister of education and transmitted Northumbrian culture to the Continent when it was obliterated here by the Dan. invasions. In England the torch of learning was taken up by Wessex, and Alfred the Great (849-99) at his court of Winchester maintained it, his kingdom being eventually overwhelmed in turn by the Norman invasion. Only a few fragments remain of what must have been a rich L., the most interesting being the elegiac pieces such as *Widsith*, *The Wanderer*, *The Seafarer*, *The Ruin*, and 2 fine war poems, *Brunanburh*, and *The Battle of Maldon*. The poetic technique of all these was entirely different from ours, for in place of rhyme they employ

short rhythmical lines marked by strong alliteration, or 'head-rhyme' as it is sometimes called. O.E. poets whose names are preserved are Caedmon (7th cent.), an inspired cowherd belonging to Bede's monastery, and Cynewulf (9th cent.), who wrote a number of religious poems. In prose the work of King Alfred's school of writers was carried on by Ælfric (c. 955-c. 1022), abbot of Eynsham, who wrote religious works in E. as well as in Lat.

With the Norman conquest in the 11th cent. A.-S. culture came to an end, for Norman-Fr. replaced E. at the court and among the upper class, though E., of course, remained the speech of the common people. For more than a century there was little or no vernacular L.; but about 1200 Layamon wrote *The Brut*, a metrical hist. of England which contains the stories of King Arthur, Lear, Cymbeline, and other legendary Brit. heroes. Of about the same date are *The Owl and the Nightingale*, a graceful allegorical poem, the *Ormulum*, an E. paraphrase of the Gospels with a homily on each, and the *Aurene Rible*, a prose manual of devotion. The 12th cent. saw the cult of the troubadour poetry in France, and England soon produced similar metrical romances, telling the story of King Arthur, as in *Sir Tristram* and *Yvain and Gauvain*; relating E. tales, as in *The Seven Wise Masters*; following Dan. originals, as in *Harleik* and *King Horn*; or based on E. folk tales, as in *Guy of Warwick*. For the most part the poetry of this M.E. period used rhyme, not alliteration, but in the middle of the 14th cent. there was a remarkable alliterative revival with the poems *Gauvain and the Green Knight*, *Pearl*, *Cleanness*, and *Patience*. It is uncertain whether these are all by the same author, who is in any case unknown, but they represent poetry of a very high order. *Pearl*, an elegy for a lost child, which uses a complicated rhyme scheme along with elaborate alliteration with a skill that Swinburne might have envied, is one of the loveliest poems in the E. language, while *Gauvain*, a romantic poem of long, swinging lines, is a most spirited piece of work. Meanwhile lyric form had developed, and such poems as the well-known 'Sumer is Icoumen in' appeared as early as about 1250, to be followed by a great wealth of songs and carols.

The 14th cent. was the first great period in the development of E. L., with the appearance of Langland, Gower, and, above all, Chaucer. The L. of the country was multilingual, as is shown by the fact that John Gower (c. 1330-1408) wrote his 3 main works in 3 different languages. His *Vox Clamantis* (Voice of One Crying), a political satire, is in Lat., then and for 2 more centuries the language of learning; his *Speculum Meditantis* (Mirror of One Meditating), which won him the name of 'Moral Gower,' is in Fr., the language of the court; and only his *Confessio Amantis* (Lover's Confession), a series of popular tales, is in E., the language of the common people. Gower's

reputation has suffered because he is overshadowed by Chaucer, but he was a good narrative poet, with an easy pleasant style. Geoffrey Chaucer (c. 1340-1400) writes in E. throughout, but his early poems follow Fr. models, while his middle period shows the influence of Dante and Boccaccio; and it is only in his last work, the 2 dozen *Canterbury Tales*, that he becomes entirely E. The importance of this work can hardly be exaggerated. It is, in its own right, one of the finest series of poems in E. L., with its broad humanity, its clear simplicity, its close power of observation, and its delightful humour. But it is also of supreme importance for its influence on the E. language. Chaucer welded together the E. and Fr. elements in the native tongue, and was the first master, almost the creator, of Mod. E., well named 'Dan Chaucer, well of English undefled.' To realise by contrast the greatness of his achievement we have only to look at the 3rd main poet of this century. Wm. Langland (c. 1332-c. 1400) represents the early traditions of E. poetry. His *Vision Concerning Piers the Plowman* is an allegorical satire, written in the old alliterative verse. It remained a popular source of inspiration for 2 centuries, but in its vocabulary and literary technique it looks back instead of forward. A prose work of this century which deserves mention is the *Voyage and Travel of Sir John Mandeville*, c. 1370.

Chaucer had many followers but no successor. The 15th cent. is, indeed, a barren literary period, the whole country suffering in its latter part from the disastrous Wars of the Roses. Among the E. Chaucerians, John Lydgate (c. 1370-c. 1451), a monk of Bury, was a versatile and voluminous but mediocre poet; his works include *The Troy Book* and *The Fall of Princes*. Thomas Occleve or Hoccleve (c. 1370-c. 1450) also wrote dull verse on noble subjects; his *De Regimine Principum*, 1411-12, was written as a guide to duty for Shakespeare's 'madcap Prince of Wales' afterwards Henry V. Stephen Hawes (1474-c. 1523), groom of the chamber to Henry VII, wrote *The Pastyme of Pleasure*. Far more spirited work was that of the so-called Scottish Chaucerians, King James I, Henryson, and Dunbar (see SCOTTISH LITERATURE). An Eng. poet who defies classification is John Skelton (c. 1460-c. 1529), who wrote satires in a short irregular metre not far removed from doggerel. But the 15th cent. was notable for one supreme development. Caxton, who had learned the art of printing on the Continent, came to England in 1476 and set up his press in Westminster. One of the earliest books to be printed was the *Morte d'Arthur* of Sir Thomas Malory (c. 1400-70); trans. from the Fr. with additions, it is one of the best examples of early E. prose. The 15th cent. was also the great period of the ballad. Such poems as *The Nutbrown Maid*, the Robin Hood ballads, *Cherry Chase*, and *Sir Patrick Spens* show the wealth of folk poetry at this time.

In the 16th cent. the impact of the Renaissance was apparent in E. L. The end of the Eastern Empire, signalised by the fall of Constantinople in 1453, had caused the exodus of a vast body of scholars from there to Europe, and the result was a great revival of classical learning in the W. Italy had led the way in this development, and it was by following it, models that England first took part in it. The cult of the sonnet, an It. verse form, was introduced by Sir Thomas Wyatt (1503-42) and Henry Howard, earl of Surrey (1516-47). The latter, a more accomplished versifier, abandoned the Petrarchan sonnet for a form of his own, with 3 quatrains and a rhyming couplet, which was later employed by Shakespeare; in his trans. from Virgil Surrey was also the first to make use of blank verse. The work of these 2 poets appeared in *Tottel's Miscellany*, 1537, one of many anthologies pub. at this time. Among their flowery titles are *A Mirror for Magistrates*, 1559, *The Paradise of Daymy Demies*, 1576, *A Gorgeous Gallery of Gallant Inventions*, 1578, and *A Handful of Pleasant Delities*, 1584. Meanwhile Edmund Spenser (c. 1552-99), the chief poet of the Elizabethan age, made his appearance. Spenser is England's 2nd great poet. His *Shepherd's Calendar* and *Epithalamion* mark him as of high rank, but his greatest work was his allegorical epic *The Faerie Queene*, a poem of rare imaginative power and beauty which reflected the ideals of the passing age of chivalry and had a great influence on succeeding writers from Milton to Tennyson.

The L. of the Elizabethan age shows extraordinary richness and variety. Famed above all for its drama, it saw the beginnings of a great many other types of L. Trans., as might be expected, was early inspired by the Renaissance, among the more influential works being Phaer's Virgil, 1652. Golding's Ovid, 1565-7, North's Plutarch, 1579, Florio's Montaigne, 1603, and Chapman's Homer, 1611-16. A typical Elizabethan was Sir Philip Sidney (1554-86), who during his short life as courtier, diplomat, and soldier found time to be a pioneer in three types of L. His *Astrophel and Stella* was the first and, apart from Shakespeare's the best, of the sonnet sequences which then became so fashionable. Other series of this type were Henry Constable's *Diana*, 1592, Samuel Daniel's *Delia*, 1592, and Thomas Lodge's *Phyllis*, 1593. Sidney's *Apologie for Poetrie*, written before 1583 and later called the *Defence of Poesie*, was the first serious work of literary criticism in the E. language; other treatises on this subject were Wm Webbe's *Discourse of English Poetrie*, 1586, which advocates the use of classical metres, *The Arte of English Poetrie*, 1589, attributes to Puttenham, and Daniel's *Defence of Lytne*, 1603. Finally, in Sidney's *Arcadia*, written for his sister, the countess of Pembroke, we have the finest of those prose romances that were the nearest the

Elizabethans got to the modern novel; other works of this type are John Lyly's *Euphues*, 1578, which started a whole fashion of style; and Greene's *Pandosto* and Lodge's *Rosalynde*, which Shakespeare used as the sources for the plots of *The Winter's Tale* and *As You Like It* respectively. An early example of the picaresque novel is Thomas Nashe's *Unfortunate Traveller*, 1594. In 1597 Francis Bacon initiated a new type of composition with the pub. of his *Essays*. Throughout the reign there were pub. innumerable pamphlets, with such striking titles as Nash's *Pierce Penitence his Supplication to the Dirrell*, 1592, Greene's *A Groatworth of Wit Bought with a Million of Repentance*, 1592, Marston's *Scourge of Villanie*, 1599, and Dekker's *Newes from Hell*, 1606.

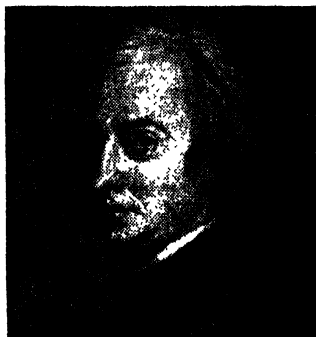
The term 'Elizabethan' is often loosely applied to the whole group of playwrights from about 1590 to 1642, though of course a great part of this half-century is Jacobean or Caroline, much of the work, including Shakespeare's finest plays, appearing after the death of Elizabeth I in 1603. The earliest origins of E. drama lie in the medieval miracle plays and moralities, but Elizabethan drama was mainly modelled on classical types, tragedy following the 'revenge' plays of the younger Seneca. It is usually counted that the first Eng. comedy was *Italph Roister Doister*, 1533, and the first tragedy *Gorboduc* or *Ferrex and Porrex*, 1561. Elizabethan drama began with the plays of the 'University Wits,' John Lyly (c. 1554-1606), George Peele (c. 1558-c. 1597), Robert Greene (c. 1560-1592), and Christopher Marlowe (1564-93). Of these Marlowe is much the most important. In his *Tamburlaine*, 1590, he made a great advance in the handling of blank verse, and his historical play, *Edward II*, shows considerable power of character-drawing. He had also a great command of language. All these writers were eclipsed by Wm Shakespeare (1564-1616), whose powers as playwright and poet are so far in advance of his fellows that comparison is futile. Alike in tragedy, where his *Hamlet* shows to what sublime heights the Senecan revenge plot could rise; in the romantic comedy of *As You Like It*, the faery fantasy of *The Tempest*, or the pagantry of *Henry IV* and other historical plays, he shows himself supreme. Great as he was, the other Elizabethan playwrights form a galaxy which must be reckoned brilliant even though he overshadows them. Most noteworthy was his friend, the learned Ben Jonson (1572-1637), who wrote clever plots round characters each dominated by a particular trait or 'humour'; typical of this 'comedy of humours' are *Every Man in his Humour*, *Volpone*, and *The Alchemist*. Other contemporary dramatists were long-lived George Chapman (c. 1559-1634), who wrote some ponderous historical plays, while Thomas Dekker (c. 1570-c. 1632) and Thomas Heywood (c. 1573-1641) wrote 'domestic dramas' of London life, the former's *Shoemaker's*

Holiday being one of the finest of this type. Sombre plays of horror or melancholy were characteristic of John Marston (c. 1575-1634), Cyril Tourneur (c. 1575-1626), John Webster (c. 1580-c. 1625), and John Ford (1586-c. 1640). Shakespeare's chief successors in popularity were Francis Beaumont (1584-1616) and John Fletcher (1579-1625), who wrote in such close collaboration that experts are still uncertain how to apportion the authorship of the plays claimed for them. Fletcher probably wrote a great part of the Shakespearean *Henry VIII*, and his vivid sense of beauty is shown in his pastoral comedy *The Faithful Shepherdess*. With Philip Massinger (1583-1640), best known for his comedy *A New Way to Pay Old Debts*, and James Shirley (1596-1666) this period of the drama

course the greatest figure of the period. He is essentially an artificial poet, even in his early works such as the delightful *L'Allegro* and *Il Penseroso*. Gov. secretary during the Commonwealth, he was free after the Restoration to develop his life work, the greatest religious poem of the E. language, *Paradise Lost*, which is unsurpassed for grandeur and sublimity. One of the greatest of all artificial epics, it challenges comparison with the work of Virgil. In prose too the 17th cent. was pre-eminently religious, from the A.V. of the Bible, 1611, to John Bunyan's *Pilgrim's Progress*, 1678, which did for the humbler classes what Milton did for the more learned. Other notable religious works were Sir Thomas Browne's *Religio Medici*, 1643, and Jeremy Taylor's *Holy*



WILLIAM SHAKESPEARE



JOHN DRYDEN

comes to an end, the playhouses being closed by the Puritan parliament in 1642.

Literary development in the 17th cent. is broken into 2 parts by the years of the Commonwealth, 1649-60. The earlier part is commonly styled the age of Milton, though his greatest work was after 1660, while the later part, in which Dryden is the leading figure, began that great Augustan age which was to stretch to the end of the 18th cent. Early 17th-cent. lyric poetry is a continuation of Elizabethan, and the graceful short poems of Robert Herrick (1591-1634) were later to find an echo in the elegant love lyrics of the group of Cavalier poets, Thomas Carew (1598-1634), Sir John Suckling (1609-42), and Richard Lovelace (1618-1658). But the general trend of the century was religious, and there was much verse of a curiously artificial and mannered cast to which the name 'metaphysical' has been given. Its chief exponent was John Donne (1573-1631), dean of St Paul's, who wrote harsh but powerful poems. Others were George Herbert (1593-1633), Henry Vaughan (1622-95), styled the Silurist because he came from Wales, and Richard Crashaw (1612-49), one of the greatest E. Rom. Catholic poets and an inspired mystic. John Milton (1608-74) is of

Living, 1650, and *Holy Dying*, 1651, which did much to mould Eng. prose. A work that has always defied classification is Robert Burton's *Anatomy of Melancholy*, 1621, an extraordinary miscellany of learning and philosophy.

In the latter part of the 17th cent. John Dryden (1631-1700), by adopting the heroic couplet for his poems, set a fashion which was to last for over a century. He is chiefly remembered for his satires such as *Absalom and Achitophel*, 1681, and for his Pindaric odes, but he was in fact one of the greatest all-round writers in our l. His plays were among the best of his time, his *All for Love* being able to stand comparison with Shakespeare's *Antony and Cleopatra* on the same theme, while his *Essay on Dramatic Poesy*, 1668, shows his ability as a critic. With Dryden may be grouped the poets Abraham Cowley (1618-67) and Edmund Waller (1606-87). Samuel Butler (1612-1680) produced in *Hudibras* a mock epic which makes merciless fun of the Puritans. But perhaps the most noteworthy reaction observable in Restoration l. was in the drama, where a notorious collection of witty but extremely indecent plays were written by Wm Wycherley

(1640-1716), Wm Congreve (1670-1730), Sir John Vanbrugh (1664-1726), and George Farquhar (1678-1707). Their indecency was condemned by Jeremy Collier in his *Short View of the Immorality and Profaneness of the English Stage*, 1698, but the Comedy of Manners, as it has been termed, set a lasting fashion in witty dialogue. To this period belong also the diarists John Evelyn (1620-1706) and Samuel Pepys (1633-1703), most famous of all, who gives a vivid picture both of his times and of his own personality.

In the early part of the 18th cent. the leading poet was Alexander Pope (1688-1744), who took over the heroic couplet from Dryden and made of it an even more perfect instrument for polished satire and philosophical reflection. In his *Rape of the Lock*, 1712, he wrote the most exquisite mock-heroic poem in our literature; in the *Dunciad*, 1728, he pilloried all his poetical rivals; and in his *Essay on Man*, 1733-4, he clothed commonplace moralising in a series of brilliant verse epigrams. He also trans. Homer into faultless if quite incongruous Augustan verse. In Pope's day correctness and adherence to classical rules, by which were meant those of the Lat. poets, who were themselves artificial and derivative, were considered the ideal to follow, and poetry was fettered by conventions that made free expression impossible. The reign of Queen Anne was also the age of the periodical essay, of which Joseph Addison (1672-1719) and Richard Steele (1672-1729) were masters, the *Tatler*, 1709-11, being followed by the more famous *Spectator*, 1711-12. Other leading prose writers of the period were Daniel Defoe (c. 1660-1731), journalist and fiction writer, famous for his *Robinson Crusoe*, 1719, and Jonathan Swift (1667-1745), Dean of St Patrick's, Dublin, whose bitterly misanthropical satire *Gulliver's Travels*, 1726, has by a strange turn of irony become in its expurgated form a popular book for children.

The 2nd half of the 18th cent. is often termed the age of Johnson. Critic, essayist, poet, and compiler of the first authoritative E. dictionary, Samuel Johnson (1709-84) was the dominant literary figure of his time, and his personality has been vividly reproduced through his conversations, reported by James Boswell (1740-95) in the greatest of all E. biographies. Another member of Johnson's circle was Oliver Goldsmith (1730-74), a versatile writer noted for his successful comedy *The Stoops to Conquer*, his poem *The Deserted Village*, with its idealised picture of rural life, and his sedate novel, *The Vicar of Wakefield*. The latter 18th cent. saw the first flowering of the E. novel. Samuel Richardson (1689-1761) in 1740 pub. *Pamela*, commonly accepted as the first genuine novel in the language, and followed it with two others. Henry Fielding (1707-54) started his *Joseph Andrews*, 1742, as a skit on *Pamela*, but it developed into a successful story in its own right, and was followed by *Tom Jones*, 1749, his greatest work.

Richardson, who cast his stories in the form of letters, was the first psychological novelist, while Fielding claimed that his new literary type was 'a comic epic poem in prose.' Laurence Sterne (1713-68) produced in *Tristram Shandy* an eccentric rambling composition made up mainly of asides and digressions; with no plot and practically no story it was nevertheless highly popular. Tobias Smollett (1721-1771) pub. the lively picaresque tales *Roderick Random*, *Humphrey Clinker*, and others. An early woman novelist was Fanny Burney (1752-1840), whose *Evelina*, 1778, caused a great sensation. Meanwhile there was a gradual movement in poetry away from the classical correctness of the Augustans. James Thomson (1700-48) in his *Seasons* was one of the earliest to describe the beauty of nature. Wm Collins (1721-59) wrote an unrhymed *Ode to Evening* which shows a similar feeling, and Thomas Gray (1716-71), though most famous for his classically correct *Ritegry in a Country Churchyard*, showed in his letters a strong feeling for nature. Wm Cowper (1731-1800) wrote of the charm of country scenes, while George Crabbe (1754-1832) proceeded in realist verse to 'debunk' the false pastoral idealism of the Augustan school. At the same time an antiquarian spirit was shown in *Percy's Reliques*, 1765, in the prose poems attributed to Ossian, and in the extraordinary medieval imitations of ill-fated Thomas Chatterton (1752-70). A mystical poet who in some respects forms a link between this period and the next was William Blake (1757-1827).

With the 19th cent. began the Romantic Revival, a literary movement second in importance only to the Renaissance. In Europe this revolution in thought caused political upheaval, while in England it brought the end of the genteel neo-classical standards which had ruled L. for more than a century. The beginning of the movement is generally dated from the pub. of *Lyrical Ballads*, 1798, the joint work of Wordsworth and Coleridge. Wm Wordsworth (1770-1850) lived right through the Romantic movement and was in many ways its most important and characteristic Eng. champion. He maintained that poetry should use ordinary speech and tell of ordinary people. His philosophy of life is set out in the long *Prelude*, but he was above all the poet of outdoor nature, finding greatest inspiration in birds and flowers. His friend Samuel Taylor Coleridge (1772-1834) developed in *The Ancient Mariner* and *Christabel* a vein of imaginative romance, but after 1802 was known mainly for his philosophy and criticism. Third of the so-called Lake School of poets was Robert Southey (1774-1843), whose poetical E. romances have been forgotten while his life of Nelson is still admired. With Percy Bysshe Shelley (1792-1822) and John Keats (1795-1821) the Romantic movement entered on a second phase. Shelley, a champion of freedom like the hero of his drama *Prometheus Unbound*,

had an ear for verse music which has rarely been equalled, and is one of our greatest lyric poets. Keats was in some ways the most perfect poet of them all. Although he knew no Greek, his great poems, *Endymion* and *Hyperion*, are on Gk subjects and reproduce the Gk spirit, while his lyrics have a sensuous beauty surpassing even those of the ethereal Shelley. Both of these poets *d.* young, as did also the third of this group, Lord Byron (1788-1824), who not merely preached the gospel of freedom but gave his life for it in Greece. Byron, like Southey, wrote many E. romances. He gave a poetical account of his European wanderings under the title *Childe Harold's Pilgrimage*, but was most successful with a satirical epic, *Don Juan*, which reveals him to be as much an Augustan as a Romantic.

The Romantic movement revolutionised prose as much as it did poetry. Towards the end of the 18th cent. there had been a fashion for tales of mystery and horror, of which Ann Radcliffe's *Mysteries of Udolpho*, 1794, and Matthew Lewis's *The Monk*, 1796, are typical; Mary Shelley's *Frankenstein*, 1817, and Charles Maturin's *Melmoth the Wanderer*, 1820, show the later development of the Gothic Revival. These tales were burlesqued by Jane Austen (1775-1817) in *Northanger Abbey*, but *Pride and Prejudice* and her other delightful books belong rather in spirit to the previous century; the greatest of our women novelists was uninfluenced by the events of her times. It was left for Sir Walter Scott (1771-1832) to develop the prose aspect of the romantic movement in historical novels like *Ivanhoe* and *Quentin Durward*, though Scottish tales like *The Heart of Midlothian*, in which he could show his power of character-drawing, were the most successful artistically. Scott had already worked the historical vein in his poems *Marmion* and *The Lady of the Lake*, but was eclipsed in popularity by Byron. A later writer of historical romance was Bulwer Lytton (1803-73), whose *Last Days of Pompeii* and *Last of the Barons* still have popularity. Meanwhile Charles Lamb (1775-1834), writing as 'Elia,' had developed the essay in an inconsequent but fascinating form which transformed it and started a new style. Lamb was also a fine literary critic, but in this he was surpassed by Wm Hazlitt (1778-1830), often reckoned the greatest critic in E. L. Other essayists were Leigh Hunt (1784-1859), who developed its lighter side, and Thomas De Quincey (1785-1859), noted for his ornate prose style.

The Victorian age lasted from 1837 to 1901 and saw an efflorescence of literary work comparable to that of the Elizabethan age. Modern critics writing in a time of disillusionment have affected to despise the Victorians for their respectability and self-satisfaction, but the greatness of their work is unquestioned. Coincident with the great queen's reign and representing it in every important respect, was Lord Tennyson (1809-92),

Post Laureate. One of the greatest masters of verse technique, Tennyson excelled as a lyric poet. Profundity, which he often lacked, is shown in his great elegy *In Memoriam* and in such short pieces as 'Crossing the Bar.' A contrast to him was Robert Browning (1812-89), the supreme advocate of self-development as Tennyson was of self-discipline. Browning was greatest in psychological studies and in dramatic monologues, his longest poem being *The Ring and the Book*. Criticised as obscure and tortuous, he is clear and simple in his lyrics. With Browning may be considered his wife, Elizabeth Barrett (1806-61), who when they married was more celebrated than he. In spite of manifest faults she has a claim to be counted our greatest poetess, and her *Sonnets from the Portuguese* are among the most moving expressions of love from a woman's standpoint. Matthew Arnold (1822-88), in poetry a disciple of Wordsworth who followed classical models, wielded great influence with his *Essays in Criticism*.

The Victorian age was also a great age of prose, providing in Thomas Carlyle (1795-1881) and Lord Macaulay (1800-59) two of our greatest historians and essayists. It saw too the second flourishing period of the Eng. novel in the work of Charles Dickens (1812-70) and Wm Makepeace Thackeray (1811-63). Dickens is still the most popular of all E. novelists, and the only one whose main works, especially the *Pickwick Papers*, are quoted freely. A member of the lower classes, with an imperfect education, he excelled in depicting common people. But his characters are unique, for they are formed rather in the manner of Jonson's comedy of humours, to display in each case some particular trait; they are in fact caricatures, and very delightful ones. Thackeray, by contrast, belonged to the upper classes, and even his *Vanity Fair* and *Henry Esmond* have a share of snobbery. Like Dickens he had a close insight into human nature and great powers of observation, but he lacked Dickens's richness and variety. Contemporary with these two were a number of women novelists. First, there was that remarkable group, the Brontë sisters. Charlotte (1816-55) was the most successful of the three, and in *Shirley* and *Villette* showed herself a pioneer in that introspective type of fiction for which women writers are particularly fitted. *Wuthering Heights*, the one novel written by Emily Brontë (1818-48), is a morbid but powerful piece of work, and Emily was also the poet of the family. Lastly we come to George Eliot (1819-80), as Mary Ann Evans chose to be called. In *Adam Bede*, *The Mill on the Floss*, and her other novels she wrote moral studies linked to effective descriptions of E. country life. A Victorian writer who attained great popularity in the 20th cent. was Anthony Trollope (1815-82), who in his *Barchester* novels described with fidelity and humour the life of an Eng. cathedral city.

In the latter part of the 19th cent. an important poetical development was the formation of the Pro-Raphaelite brotherhood. It was primarily an artistic fraternity, but on the literary side the chief members were Dante Gabriel Rossetti (1828-82), his sister Christina Rossetti (1830-94), and Wm. Morris (1834-96). As its name implies, the group aimed at reviving the simple beauties of medieval art, and its poetry had the same glowing colour and gorgeousness as its painting. Morris, a many-sided genius, was one of the leaders of the Socialist movement, and Christina Rossetti disputes with Mrs Browning the title of greatest E. poetess, her work showing



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passionate intensity with strong devotional feeling. Associated with this school was Algernon Charles Swinburne (1837-1909), a supreme master of verse melody whose poetry charms by sheer beauty of sound; the choruses from his *Atalanta in Calydon* have a perfection of cadence that has never been surpassed. In many members of this group there was a tendency for sensuousness to degenerate into sensuality, and their followers, the 'aesthetic poets' of the 90's, seemed to pursue decadence with deliberate intent. This later movement was finally brought into disrepute through the disgrace of Oscar Wilde (1856-1900). The 90's also witnessed the cult of the small exquisite poem, which led a critic to style it 'the age of Bovril.' Of this type of work the finest example was A. E. Housman's *Shropshire Lad*, 1896, which, apart from its pessimism caught the spirit of the writers in the Gk Anthology.

The fiction of the end of the Victorian age requires a section to itself. George

Meredith (1828-1909) wrote his novels in an affected style which led Wilde to call him 'a prose Browning,' but he ranks high through the knowledge of human motives shown in such novels as *The Egoist*. Thomas Hardy (1840-1928) preached a dreary pessimism, and in spite of their undoubted power the sordid realism of *Jess of the D'Urbervilles* and *Jude the Obscure* roused so much hostile criticism that he abandoned fiction for poetry. It has been maintained that Hardy and Meredith are both better poets than novelists, Meredith being one of our finest poets of nature. Robert Louis Stevenson (1850-94) a very finished stylist, produced many romances of adventure, *Kidnapped* being perhaps the most famous, but is at least as well remembered for his boys' book *Treasure Island*, which is a children's classic. Rudyard Kipling (1865-1936), our most brilliant writer of short stories, also wrote sev. books for children, including the 2 *Jungle Books* and *Just So Stories*. The late 19th cent. was a golden age of boys' books, R. M. Ballantyne (1825-94) and G. A. Henty (1832-1902) being the chief writers of adventure stories, while T. Hughes's *Tom Brown's Schooldays*, 1856, and F. W. Farrar's *Erie*, 1858, started the fashion in school stories. Most successful of writers for children of all ages was Lewis Carroll (1832-98), whose fairy-tale absurdities *Alice in Wonderland* and *Through the Looking Glass* are more often quoted than any books except Shakespeare and the novels of Dickens.

From the start the 20th cent. was critical of the previous age. All the leading authors were devoted to one phase or another of social reform. George Bernard Shaw (1856-1950) wrote brilliantly witty plays which held the mirror up not to nature but to the national weaknesses. In such works as *Plays Pleasant and Unpleasant*, *Man and Superman*, *Heartbreak House*, and *Saint Joan* he dealt with all questions from religion to phonetics and from marriage to militarism. H. G. Wells (1866-1946) began with science fiction as in *The Time Machine*, 1895, went on to sympathetic novels of the lower classes, of which *Kipps*, 1905, is the most famous, but later wrote thinly disguised propaganda and utopias of the future. Even John Galsworthy (1867-1933), spokesman in the *Forsyte Saga* of a ruling class that has now vanished, took the part of the underdog in such plays as *Strife* and *Justice*. In poetry a reaction against the over-luxuriance of recent writers was seen in Kipling's virile verse and the similar work of Henry Newbolt (1862-1938) and John Masefield (1878-), who became Poet Laureate. The vivid word-painting of Masefield's early sea poems reappeared in the stark realism of such pieces as *The Everlasting Mercy*, 1911. A revolt of a different kind was that of the Imagist group of poets formed just before the First World War. Abandoning rhyme as a distraction, they aimed at conciseness and objectivity, seeking always the

perfect phrase. Nearly all the members of the group finally developed along other lines, but the impetus they gave to unrhymed verse was nevertheless considerable, and it is from this period that its general use is dated. In 1918 were pub. the works of Gerard Manly Hopkins (1844-89), a gifted poet of an earlier generation whose innovations in rhythm were much in advance of his time. At the time of the First World War there were a number of poets, loosely termed Georgian, producing work of diverse types. In a later reaction against their style 'Georgian' has become almost a term of reproach. But such poets as Walter de la Mare (1873-1956), writer of exquisite verse and for children, Alfred Noyes (1880-), who produced the finest fairy poetry seen since the Elizabethans, and Edmund Blunden (1896-), a placid writer of nature poetry, were still admired by later generations. Rupert Brooke (1887-1915) earned a briefer fame by his sensuous verse, his magnificent war sonnets, and his tragic death on active service. The essay was a highly popular form at this time and was used with great skill by Sir Max Beerbohm (1872-1956), G. K. Chesterton (1874-1936), Hilaire Belloc (1870-1953), E. V. Lucas (1868-1938), and Robert Lynd (1879-1949).

From the outbreak of the First World War to the Second was a time of revolt and innovation. D. H. Lawrence (1885-1930), attacking Victorian conventions, exploited the sex motif to excess in his novels, and had a number of imitators. An entirely new technique of fiction was introduced by Dorothy Richardson (1873-1957), who initiated the 'stream of consciousness' school, reconstructing reality as a series of images running through the mind of one person. A somewhat similar technique was used with more artistry by Virginia Woolf (1882-1941), while James Joyce (1882-1941), her exact contemporary, carried experiment still further in his *Ulysses*, a sort of modern *Tristram Shandy*, which describes in minute detail a day in the life of 3 characters, sometimes employing a vocabulary specially coined by the author. Novelists who began earlier but attained their fuller powers in this period were Somerset Maugham (1874-), K. M. Forester (1879-), Sir Compton Mackenzie (1883-), and Sir Hugh Walpole (1884-1941). Brilliant satirists among the younger generation were Aldous Huxley (1894-), Alec Waugh (1898-), and Evelyn Waugh (1903-), while writers of more orthodox fiction were J. B. Priestley (1894-) and A. J. Cronin (1896-). An outstanding fashion in popular fiction was the insatiable demand for detective stories, a genre started in this country by Sir A. Conan Doyle (1859-1930) with his Sherlock Holmes series. Writers vied in providing ingenious plots, two of the best being women, Agatha Christie (1891-) and Dorothy Sayers (1893-). Of the straightforward thriller of action Edgar Wallace (1875-1932) was the prolific provider. In hist., G. Lytton Strachey

(1880-1932) started the vogue of the 'debunking' biography in 1918 with his *Eminent Victorians*, which showed up those weaknesses that more reticent biographers had been accustomed to omit or gloss over. In poetry, T. S. Eliot's remarkable *Waste Land*, 1922, was said to mark an epoch. It did so in the sense its title indicates, as a confession of the barrenness of the times. By its erudition, obscurity, and pessimism it was characteristic of much verse of the period. Followers of Eliot who formed the most important group of the period between the wars were C. Day Lewis (1904-), W. H. Auden (1907-), and Stephen Spender (1909-), all of whom wrote verse during the 30's on sociological or political subjects and leaned towards Communism in the days before it was discredited. Their work fell short of being great poetry, but the prestige they enjoyed is shown by the fact that the first two were elected in succession to the Chair of Poetry at Oxford. A poetess of a highly individual cast was Dame Edith Sitwell (1887-) who, like her famous brothers, made novel experiments in imagery.

The period since the Second World War is too short and too recent to be viewed in proper perspective. Noteworthy novelists are Graham Greene (1904-), a master of sinister fiction, and George Orwell (1903-50), author of the brilliant political satires *Animal Farm* and *1984*. In Dylan Thomas (1914-53) it had a poet of genius whose striking imagery and original phrasing showed affinities with Hopkins. A hopeful sign was the revival of verse drama in the work of T. S. Eliot and Christopher Fry (1907-). But compared with other periods it has been weak in creative work. Even the fount of the detective novel is running dry, and for escapist L. we are offered science fiction or, what is escapist in a literal sense, accounts of flights from prison camps during the war. Hist., biography, and memoirs bulk highest in the works of the time, with Sir Winston Churchill (1874-) setting an example in his accounts of his own great period of statesmanship. Autobiographies have now grown to such proportions that authors take a whole series of vols. to relate the events of their lives. It seems likely that the 20th cent., like the 18th, will go down to posterity as an age of prose and reason, and indeed some of the younger writers are already claiming kinship with the Augustans. In reference works the period has been particularly rich, from the great *Oxford English Dictionary*, finished in 1928, and the various Cambridge hist., literary, and medieval, and modern, to the innumerable dictionaries and encyclopedias that have been pub. in recent years. If not a productive age in the fullest sense, it has provided the writer with a very complete set of the tools of his trade.

See G. Saintsbury, *A Short History of English Literature*, 1898; A. W. Ward and A. R. Waller (ed.), *The Cambridge History*

of *English Literature*, 15 vols. 1907-16; J. C. Ghosh and E. G. Withycombe, *Annals of English Literature*, 1936; D. Patrick and J. L. Geddie (ed.), *Chambers's Cyclopaedia of English Literature*, 3 vols. 1938; G. Sampson, *The Concise Cambridge History of English Literature*, 1942; F. P. Wilson and B. Dobrée (ed.), *The Oxford History of English Literature*; vols. so far issued, E. K. Chambers, *English Literature at the Close of the Middle Ages*, 1945, H. S. Bennett, *Chaucer and the Fifteenth Century*, 1947, C. S. Lewis, *English Literature in the Sixteenth Century*, 1954, D. Bush, *English Literature in the Earlier Seventeenth Century*, 1945; Sir P. Harvey, *The Oxford Companion to English Literature*, 3rd ed. 1946; Emile Legouis and Louis Cazamian, *A History of English Literature*, new ed. 1956; D. C. Browning, *Dictionary of Literary Biography*, 1957.

English Music, see BRITISH MUSIC.

'English Review, The', started by John Murray (q.v.), the celebrated publisher. It first appeared as an ann. register, entitled *The London Mercury*. A 2s. 6d. review of the same name was founded by Chapman & Hall in 1908. Noteworthy for its high literary qualities, it devoted itself to the pub. of such articles, essays, belles lettres, short stories, and poems, as it considered remarkable for intrinsic merit.

English River, see CHURCHILL RIVER.

English Setter, see SETTER.

English Terrier, see TERRIER, OLD ENGLISH.

Engishry, term used during the Norman rule in England. It was used to show contempt, for if the hundred could prove that a murdered person was Eng., that is to say, make a 'presentment of E.' it escaped without punishment. This was abolished in the first half of the 14th cent.

Engraving, primarily the art of drawing on a substance by means of an incised line. The term was early applied to the work produced by that process and later to the impression of the engraved work upon a sheet of paper. This article deals with E. on metals. From very early times gems have been engraved with ornaments or signets, and commemorative inscriptions have been cut into metal tablets; but technically the word E. is confined to the incision of a design upon a plate of metal or a wooden block, for the purpose of producing upon paper by the aid of ink a series of reproductions of that design. Copper plate and steel E. was introduced at the end of the 15th cent. On metals, E.s are usually in intaglio, that is, the lines are sunk in and possess a positive value in that they actually trace the design. In woodcuts and wood-engraving (q.v.) the lines are negative, their object being to leave the true design projecting in relief. Copper and steel are the favourite metals of engravers, but zinc, brass, silver, and iron have also been employed. Steel is much harder to work with than copper, but on the other hand its very toughness makes it possible to take off a greater number of good impres-

sions. By means of electrolysis, it is now possible for the engraver to protect his copper plate by a thick coating of steel; the result of this has been almost to do away with steel plates altogether. Copper has always been preferred where the aim of the artist is to produce a highly finished and delicate reproduction of the design.

Line Engraving.—Implies the use of a tool called the graver or burin. This consists of a steel rod some 4 in. long, with a square or lozenge-shaped section, a sharp edge being secured by cutting the section obliquely. The engraver controls the rod by grasping a wooden handle, and in making his strokes varies the pressure in accordance with the thickness of the line



AN ENGRAVING BY DÜRER:

'Christ on the Cross'

desired. When his work is finished he covers the plate with printer's ink, presses it into the incisions by the aid of a dabber, rubs away the superfluous ink with a piece of muslin and then carefully lays a sheet of moistened paper on the engraved surface. The plate, with the paper thus attached, is placed on a board which slides between 2 rollers in what is called the copperplate press, blankets softening the contact of paper and roller. The design is reproduced by the transference of the ink from plate to paper. *Etching* (q.v.) involves the use of a mordant to eat into the plate. An etching-ground is spread over the copper surface and the lines are opened up with an etching needle.

Dry-point is a method of E. akin to the processes already described. The implement used is a steel point stronger and more tapering than the etching needle. When this is firmly drawn across the metal surface, quite a distinct burr—like a

miniature thorn—is produced, the effect of which is to leave a semi-luminous ridge of tone at the side of each line, and thus to impart to the whole print an attractive richness of tone. Skilful engravers often blend these 3 processes in the one plate.

Tone-processes aim at achieving a result on the plate similar to that produced by a colour wash in painting. If the artist uses the 'crayon or chalk-manner,' he first perforates his etching-ground with special needles like the mace-head or roulette, his aim being to suggest the rough texture of crayon strokes. If he follows the 'stipple method,' he imitates broad tone surfaces by covering the etching-ground with dots and short strokes, using the curved stipple engraver, the dry-point, or the roulette for the purpose. The essential distinction of the *mezzotint* process is that the craftsman begins with a dark ground and proceeds to create his lights by a negative and scraping device. With the assistance of a kind of chisel, called the 'cradle' or 'rocker,' he roughens the plate by raising metal points or burrs. At this stage the copper would print a rich black, but the mezzotinter removes the burrs with his 'scraper' in proportion to the tone he wishes to produce. Thus, if he scrapes down to the bottom of the indentation, he will get a smooth surface, which will not be able to hold any ink and will therefore print white. For *aquatints* the plate is prepared for E. by a porous coating of sand or resinous gum. Bitten by acid, a granular surface results. This method produces E.s not unlike mezzotints, but less rich in quality and depth.

Not more than 25 good mezzotints or dry-points can be obtained from 1 plate, as the brilliancy of the impression depends on the delicacy of the burr. A steel facing, however, increases the number to a hundred, whilst with this protection as many as 3000 line E.s may safely be taken off. The value of a print depends on the engraver and the fineness of the impression, which decreases, naturally, with the number taken. 'Artist's proofs' are treasured, as they bear the signature of the painter or engraver, or of both. The signature is considered a guarantee of the quality of the print and may imply retouchings by the artist.

History of line-engraving and etching.

Line-engraving.—E. is an art of comparatively recent development and the earliest known illustration, with metal as the medium, is the 'Flagellation,' which is dated 1446, and is the work of a German who lived in the neighbourhood of Cologne or Basel. In Italy the art grew side by side with painting, and arose, as some think, from that of *niello* (q.v.), which was a process of incising a pattern on gold or silver and then filling in the groove with a black compound (*niellum*). The work of Maso Finiguerra (1426-64), with its plentiful cross hatchings illustrates the 'Fine Manner,' whilst that remarkably fine achievement of the Florentine Antonio Pollaiuolo (1429-98), 'The Battle of the Nudes,' exhibits the broad and simple

lines of parallel shading which characterises the exponents of the so-called 'Broad Manner.' Somewhat similar in style is 'The Virgin and Child' of Andrea Mantegna (1431-1506). Albrecht Dürer, the German (1471-1528), Marcantonio Raimondi, the Bolognese (1475-1530), and Lucas van Leyden, the Netherlander (1494-1533), form a conspicuous triumvirate of engravers. Formal dignity, refinement of touch, and unremitting care are a few of the merits of Dürer's portrait of Albrecht of Brandenburg and his 'St Jerome in the Wilderness.' Marcantonio is famous for his reproductions of Raphael's work. According to Vasari it was the engraver's magnificent 'Death of Lucretia' which was responsible for his long association with that painter. Lucas's skill may well be studied in his 'David playing before Saul.' The first Fr. engraver of note was Jean Duvert (1485-1561), whose 'Apocalypse' series emphasises his mysticism and at the same time his somewhat heavy, overloaded style. In England the same distinction must be reserved for Wm Rogers (fl. 1580-1610), who executed sev. portraits of Queen Elizabeth, all of which, however, are stiff and too ornate. Professional print-sellers, ready to provide portraits for historians and maps for discoverers, first began to flourish in the latter half of the 16th cent. The pioneers were mostly Netherlanders, like Hieronymus Cock and Philippe Galle (1551-1612), many of whom migrated to Italy and Germany and thus popularised commercial E.s abroad. Robert Nanteuil (1623-78), who was engraver at the court of Louis XIV., stands easily at the head of all Fr. engravers of portraits, and a similar honour among his own countrymen with justice claimed for Wm Faithorne (1616-91). Faithorne was the first great master of line E. and raised E. to its place in art in England, equal to any work being done on the Continent. To quote his own words: 'The result of air, the symmetry of parts, the exact harmony of proportions, of lights and shadows, may be performed to the height in Graving.' Wm Sherwin was initiated in the art of mezzotint E. by Prince Rupert and a dated mezzotint portrait of Charles II (1669) establishes him as the first Englishman to practise the art. John Smith (b. 1652) was a master of his period. He engraved over 100 portraits by Sir Godfrey Kneller and he also engraved after Correggio and Titian. John Faber (c. 1695-1756), who was b. in Holland, the son of a mezzotint engraver, engraved hundreds of plates after contemporary artists from Kneller and Reynolds to Hogarth and Frans Hals. Among the more notable of Eng. line-engravers were: George Vertue (1684-1756), engraver of portrait plates, appointed engraver to the Society of Antiquaries, and buried in Westminster Abbey; Wm Hogarth (q.v.); Ravenet, who came from France in 1750, and blended line-E. and etching; John Hall (1739-97), historical engraver to the king, one of whose works is 'Oliver

Cornwell dissolving the Long Parliament'; François Vivares (1709-80), the first landscape engraver in England and founder of a school of engravers in line; Lupton (Goff (1791-1873), mezzotint engraver, estab. the use of steel for copper; Sir Robert Strange (q.v.), who pub. (1757) the famous plates 'Caesar repudiating Pompeia,' 'Romulus and Remus,' after Cortona, and 'Charles I's Three Children' after Van Dyck, and whose masterpiece 'Charles I,' also after Van Dyck, confirmed his European reputation as an engraver of genius; Wm Woollett (1735-85), who engraved in line



AN ENGRAVING BY BLAKE:

'And my Servant Job shall pray for you'

and etching, his best plates being landscapes after Claude Lorraine and Richard Wilson, but the most famous of his works are the 'Death of General Wolfe' and 'The Battle of La Hogue,' after Benjamin West; and Wm Sharp (1749-1824), the last of the great copper-plate engravers, who executed many fine portraits after Reynolds and Romney and historical subjects. Wm Blake (1757-1827) was an engraver of peculiar merit in this period. There is true inspiration in his 'Illustrations of the Book of Job,' which have been rarely surpassed in purity of line, harmony of composition and independence of convention, whether in design or execution. In the late 18th and early 19th cents. the efforts to imitate tone in reproductive line-E. produced marvels of delicate craft, e.g. by the engravers of Turner's work, Cooke, Goodall, and others. The 19th and 20th cents., however, have seen a decline in metal E. as a handicraft, partly because

it has been superseded for practical purposes as a commercial form of reproduction and partly because artists have preferred freer modes of expression. Etching, from Whistler to Muirhead Bone, has kept its popularity with artists, and wood-E. still has its place in special forms of book illustration, but only a few artists, among whom Stephen Gooden is notable, still favour the burin. See also COLOUR PRINTING; ETCHING; MEZZOTINT; NIELLO WORK; PHOTOGRAPHURE; PROCESS WORK; WOODCUTS. See M. C. Salaman, *Old Engravers of England*, 1906 (with bibliography); A. M. Hind, *History of Engraving and Etching* (new ed.), 1923.

Enguinegatte, see GUINEGATTE.

Enharmonic, term in music, originally the name of one of the genera of *anct* (1k music, now applied to modulations made by changes of sharps to corresponding flats and vice versa, e.g. C \sharp to D \flat , E \sharp to D \sharp , etc. On the piano or other keyboard instrument tuned to the tempered scale there is no change in sound, but on string or wind instruments there is a minute difference, discernible to the trained ear.

Enid, city of Oklahoma, U.S.A., with Vance Air Force base, and an airport. The leading grain market of the state, and the trade centre for a large agric. dist. and for gas and oil fields. It is an important railway junction, has railroad shops, oil refineries, flour mills, and meat-packing plants, and makes agric. implements and wire. It is the seat of Phillips Univ. Pop. 36,017.

Enkhuizen, small tn in the prov. of N. Holland, Netherlands; it is one of the so-called dead cities of the IJsselmeer (Zuider Zee), and a delight to every visitor. In the 16th cent. E. was a prosperous tn and had a big herring fleet, but later the pop. of nearly 40,000 gradually fell to about 10,000. The great Dromedaris Tower (1540), a splendid relic of the old fortifications, stands guardian over a curious little harbour. There are many interesting buildings, the chief being the Westerkerk (Protestant Church) with a wood steeple (1519), the orphanage or Weeshuis (1616), and the tn hall (1688) containing a museum of local antiquities. The new Zuider Zee museum has an interesting collection of remains from the former Zuider Zee shores. Paul Potter (1625-1654), the Dutch painter, was b. at E.

Enkianthus, a genus of deciduous shrubs from Japan and China, family Ericaceae; sev. species are valued for gardens with lime-free soil.

Enlil, or **Ellil**, deity of the Sumerians and Babylonians, lord of the land and winds, prin. deity of Nippur (q.v.) where he was worshipped from earliest times until the end of the pre-Christian era. With Anu and Ea (qq.v.) E. formed the oldest and supreme triad of gods. In later Babylonian astronomy 'the way of Enlil' is identified with the Plough star.

Enlistment, method by which the army is recruited in countries which do not have a form of conscription. Most of the European countries have some form of

conscription, but in the case of Great Britain and America E. traditionally takes its place. Up to the beginning of the 18th cent. E. took place through an official who had no definite recognition by the army authorities, but who received a commission for every recruit. The period of service for which a soldier enlisted was not determined, in fact he served as long as he was physically fit. At the beginning of the 19th cent. recruiting was taken over by the army authorities, and since that time many changes have been made. A man on enlisting nowadays must make declaration before a magistrate or before the commanding officer. He then takes the oath, signs a declaration, and is then, and only then, held to have enlisted. Punishment for false declarations can be made either in a civil court or by means of a dist. court-martial. A soldier is at liberty to purchase a discharge under certain conditions, but never when the country is at war. In ordinary peacetime engagements soldiers enlist for 3 years with the colours and 4 with the reserve. Alternatively soldiers can enlist for a full 22 years, with the option to leave at the end of every 3rd year. A volunteer for 22 years' service can be accepted at any age between 17½ and 30.

Enna: 1. Prov. of Italy, in central Sicily (q.v.). It is generally mountainous, with many high valleys formed by the Simeto, Salso, Gela, and other rivs. The prin. tns include E., Agrig., Nicosia, and Leonforte (qq.v.). Area 990 sq. m.; pop. 249,000.

2. (Formerly **Castrogiovanni**), tn in Sicily, cap. of the prov. of M., 62 m. S.E. of Palermo (q.v.). It is 3000 ft above sea-level, in a fertile plateau. In the neighbourhood is Lake Pergusa, which is associated with the Proserpine (q.v.) myth, and the ruined citadel of E. is said to be on the site of a temple of Demeter (q.v.). There is a cathedral (13th–17th cents.) with a baroque facade. The chief trade is in rock-salt and sulphur. Pop. 27,000.

Ennerdale, rural dist. (88,000 ac.) of SW. Cumberland, England, comprising 19 pars., lying between the sea and the main group of Lake Dist. mts. There are 2 lakes, Wastwater, and E. Water with the vil. of E. situated just above it. Main industries are coal and iron-ore mining, quarrying, and 2 atomic energy works. Pop. 29,676.

Ennis: 1. Co. tn of co. Clare, Rep. of Ireland, situated on the R. Fergus, about 22 m. NW. of Limerick. In the tn are the remains of a Franciscan friary, also a Rom. Catholic cathedral and college. Shannon airport (q.v.), an international airport, is 16 m. from E. The port is Clare Castle. Pop. 6100.

2. Tn in Ellis co., Texas, U.S.A. It lies to the SE. of Dallas, with cotton gins and compresses and cotton seed oil mills. Pop. 7800.

Enniscorthy, tn of co. Wexford, Rep. of Ireland, situated on the Slaney, 14 m. NW. of Wexford. It has a beautiful situation, the land around being very

fertile. Below E. the riv. is navigable for barges. The castle, now partially destroyed, is an interesting old building. Pop. 6000.

Enniscorone, popular seaside resort, 33 m. W. of Sligo, Rep. of Ireland. Pop. 500.

Enniskillen, co. tn of Fermanagh, N. Ireland, 115 m. from Dublin and 88 m. from Belfast. Situated on an is. between Upper and Lower Lough Erne, it has suburbs on both sides. E. was granted its first charter in the 17th cent., and was a noted Protestant centre in the time of Wm III. It gave its name to 2 regiments of the Brit. Army, the 28th Foot, known as the Royal Inniskilling Fusiliers (q.v.), and the Royal Inniskilling Dragoons. Portora Royal School (1618) is by the lake shore; among its pupils were Rev. H. F. Lyte, author of 'Abide With Me'; and Oscar Wilde. It has an agric. trade, and secondary industries are the manuf. of nylon hose and bacon curing. Pop. 7500; (of rural dist. 16,000).

Ennistymon, tn of co. Clare, Rep. of Ireland, 17 m. NW. of Ennis; the famous cliffs of Moher are 7 m. to the W. Pop. 1200.

Ennius, Quintus (c. 239–169 BC), one of the first Rom. poets, b. Rudiae in Calabria. Although little is known of his hist., he seems at first to have pursued a military career. At about the age of 38 he became acquainted with M. Porcius Cato and accompanied him to Rome, where he supported himself by teaching Greek. Through the influence of Scipio Africanus, E. obtained Rom. citizenship in 184 BC, and on his death was buried in the Scipios' tomb. Though his writings included drama, satire, and didactic poems, his fame rested chiefly upon the *Annales*, an epic of Rom. hist. in 18 books of hexameters, of which about 550 lines have survived. These, however, are enough to convey some idea of the poet's rugged style which exercised enormous influence upon Lat. literature. See E. H. Warmington, *Remains of Old Latin I* (text and trans., Loeb Library), 1935; W. V. Sellar, *The Roman Poets of the Republic*, 3rd ed., 1899.

Enns: 1. Austrian tn (Rom. *Lauriacum*) in the prov. of Upper Austria, on the R. E. In the Middle Ages it was a prosperous commercial tn. The adjoining vil. of Lorch was the seat of an anct bishopric. Pop. 7600.

2. Riv. of Austria which rises S. of Radstadt, and flows into the Danube. Chief trib. is the Steier. Length 160 m.

Enoch (Hanoch): (1) A son of Cain (Gen. iv. 17); (2) a grandson of Abraham (Gen. xxv. 4); (3) a son of Reuben (Gen. xlv. 9); (4) the son of Jared and grandson of E. 1 (Gen. v. 18–24) who 'walked with God' (i.e. 'pleased God') and, after a life of 365 years, was 'translated' or assumed to heaven.—'He was not, for God took him.' Cf. Eccles. xlv. 16; Wisd. of Sol. iv. 10–14; Heb. xi. 5. The number 365 with its obvious connection with the terrestrial years is symbolical in some way. Berossus, in his hist. of ante-diluvian

Babylonian kings. places *Enedorachus* 7th. Both names may be corruptions of a Babylonian original. Jewish legend makes E. the inventor of writing, arithmetic, and astronomy, and the apocalyptic *Book of Enoch* (quoted in Jude xiv.) was ascribed to him. Among the Arabians he is known as *Idris* (the learned one). He and Elijah are usually understood to be the 2 witnesses of Rev. xi. The 'St Enoch' of Glasgow is a corruption of St Thenaw, the mother of St Kentigern.

Enoch, The 1st Book of, or The Ethiopian Enoch, composite apocalyptic work the various parts of which belong to 200-c. 1 BC. It has 6 sections: (1) The Angelic Book, which embroiders on Gen. vi. 1-4 to explain the evil in the world. (2) The Book of Parables, 3 similitudes concerning Heaven, the Messiah, and the Judgment. It has a remarkable description of the Messiah as the Pre-existent Son of Man. (3) The Book of Astronomy, about the heavenly bodies. (4) The Book of Visions, concerning the Flood and Israel's hist. (5) The Book of Exhortation, concerning rewards and punishments. (6) The Apocalypse of Weeks, concerning Heaven and Hell. The B. of E. was originally written in Hebrew, in the Palestinian region, and then trans. into Greek. It was well known to the early Christians, by many of whom it was held in high esteem. St Jude in his general epistle quotes from E. in v. 14. The work was lost about the 7th cent. and only quotations could be obtained until 1773, when James Bruce, the traveller, brought back from Abyssinia 2 Ethiopic copies of it, made from the Gk version. A trans. was pub. by Archbishop Lawrence in 1821, and the Ethiopic text followed in 1838. See R. H. Charles, *Book of Enoch*, 1906.

Enoch, The 2nd Book of (the Secrets of), or 'the Slavonic Enoch,' because the MSS. of it, only recently discovered, are in that language. It seems, however, to have been originally written in Greek during the course of the 1st cent. AD. and in Egypt. This book, which is entirely independent of the 1st Book of Enoch (q.v.) describes how Enoch was taken up into the heavens, 7 in number, and his visions there, followed by an account of his subsequent experiences. See R. H. Charles (ed.), *The Book of the Secrets of Enoch* (trans. by W. I. Morfill), 1896.

Enos, see ENEZ.

Enschede, industrial tn in the prov. of Overijssel, Netherlands, near the Ger. border. It is one of the prin. centres of the cotton industry and has parks, a trade school, and an industrial museum. The tn suffered heavily from bombs during the Second World War. Pop. (1954) 115,227.

Ense, Karl August Varnhagen von, see VARNHAGEN.

Ensete, Abyssinian banana, Musa ensete, which has the largest loaf on any known land plant, the size being as much as 17 ft by 3 ft. The flower-stem is eaten by natives, but the fruit is not edible. The plant is cultivated in tubs as a decorative plant in sub-tropical horticulture.

Ensign: 1. Originally the name applied to the lowest rank of infantry commissioned officer in the Brit. Army. He obtained this name from the fact that it was his duty to carry the colours or E., but after the custom died out the title was changed in 1871 to that of 2nd lieutenant.

2. See FLAG.

Ensilage, see HAY and ENSILAGE.

Ensisal, textile manufacturing tn on the R. Vesdre, SW. of Verviers, in the prov. of Liège, Belgium. Pop. 5700.

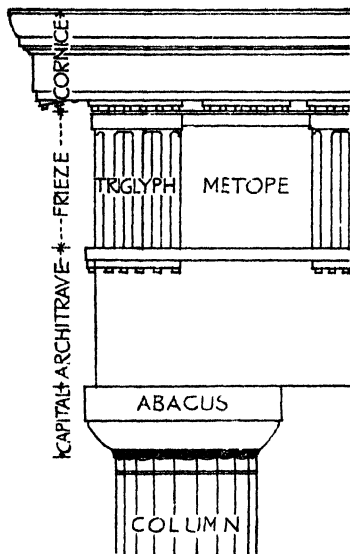
Ensor, James (1860-1947), Belgian painter, b. at Ostend of an Eng. father and Flem. mother. He studied at the Brussels academy, and returned to settle in Ostend, where he worked without appreciation, his early pictures being rejected with contempt. His ability was first recognised by Emile Vorhaeren in 1908; his reputation, estab. by an exhibition in 1929 at the Palais des Beaux-Arts, Brussels, has since become worldwide. Rich colour and a fantastic imagination that sometimes recalls his Flem. forerunners Bosch and Brueghel characterise his paintings, drawings, and etchings. 'The Skate' and 'Strange Masks' (Brussels) are examples. See L. Schwob, *Ensor*, 1926; L. Van Puyvelde, *L'ardente peinture d'Ensor*, 1939; P. Fierens, *James Ensor*, 1943.

Enstatite, silicate of magnesium, is translucent and white in colour, or sometimes has a greenish hue. It has been found in Moravia, Prussia, and other parts of Europe.

Entablature, in classical (i.e. Gk, Rom., and Renaissance) architecture, the superstructure crowning a range of columns or a building. When used above columns, this superstructure or arrangement of horizontal members forms, together with the columns, one of the 3 'Orders of Architecture'—Doric, Ionic, and Corinthian—the correct relative proportions of which were standardised by Vitruvius (q.v.) (1st cent. BC). An E. consists of 3 stages: architrave (lowest), frieze (middle), and cornice (top stage). Although the rules of Vitruvius assume these 3 stages to be built of stone, they originated in timber construction, and represent in stone the various timber beams of the superstructure. In the Gk Doric E. illustrated here, the various members are named. The illustration of the 3 'Orders' (see COLUMN) shows the E. of each of the other Gk and Rom. 'Orders.'

Entail. An entailed estate or estate tail is an estate of inheritance in land settled on sev. persons successively in a strict line of devolution, such persons being exclusively the heirs male or female of the grantee or grantees. The word E. is derived from Fr. *tailler*, 'to cut,' because the succession to the estate was cut down to the grantee for his life and then to his issue. Estates tail are either *general*, i.e. are granted 'to A and the heirs of his body' without restriction as to sex or maternity; or *special*, i.e. restricted in one or other of the above ways, e.g. 'to A and the heirs male of his body,' or 'to A and the heirs female of his body,' or 'to

A and the heirs of his body by his wife B.' The hist. of the development of estates tail may be said to be intimately bound up with the traditions and associations of co. families; the whole object of their legal creation being to tie up property in strict family settlements so as to ensure that the estates should devolve from father to son for ever. The old common law judges always construed a gift 'to A and the heirs of his body' as a gift of the full disposable estate of inheritance or fee simple (q.v.) (see also *DE DONIS*), conditional on



ENTABLATURE OF THE GREEK DORIC ORDER, FROM THE PARTHENON AT ATHENS

issue actually being born to A. Consequently when issue was born A could sell the estate and bar his own issue. Though it is now theoretically impossible to tie up lands in a family for ever, and though the tenant-in-tail can bar the rights of everyone by executing and enrolling a *disentailing deed* within 6 months of obtaining possession, the custom is for the eldest son of the grantee, on coming of age, to execute a deed with the consent of his father barring the E., and for the father and son then to enter into a deed of re-settlement by which they re-settle the land on the father for life, with *remainder* to the son for life, and then after the death of the son to the son's eldest son in tail; this process being repeated every time an eldest son reaches 21. The efficacy of this compromise in thus preserving the posthumous pride of ancestors depends

entirely on the continuous desire of each father to tie up the lands in the family and on the continuous obedience of each eldest son on attaining 21. If, however, the son prove disobedient, the father can, in theory, deprive him of all income while he (the father) remains alive, and so it came about that the son generally abstained from his right to bar his *own issue* (which he can do without the consent of his father) and 'surrendered his birth-right for a financial mess of pottage.' In this connection must be noticed the meaning of the term 'protector of the settlement.' A protector is a statutory creation, and denotes the tenant of the first life estate under the deed creating the E. (usually, of course, the eldest surviving ancestor), or some person or persons appointed by the deed itself to act as protectors. The existence of the 'protector' prevents a tenant-in-tail *not yet in possession* from barring the whole E. unless he obtains the consent of such protector, though, as seen above, he may bar his own issue. In modern times the system of E. has, by a succession of acts of parliament (particularly the *Cairns Act, 1882*, and the *Law of Property Act, 1925*), been greatly modified, and greater powers given to the actual owner of alienating the estates to which he has succeeded, a process which is called 'breaking the entail.'

Entamoeba, see AMOEBÆ.

Entasis, in architecture, a slight and subtle curve in the tapering of a classical column, to correct the optical illusion of concavity produced by normal tapering. (See *ORDERS OF ARCHITECTURE*.)

Entebbe, administrative centre of the Uganda Protectorate, on the NW. of Lake Victoria. There are botanical gardens and a cotton ginnery, and cotton, cocoa, rubber, etc., are grown in the dist. Sleeping sickness has entirely disappeared. The H.Q. of the commission appointed by the League of Nations for the study of tropical diseases is here, as also the new European hospital, Gov. House, and Court House. E. is an international airport where there is a meteorological station. Area (dist.) 2446 sq. m. (land and swamp 1980, open water 466). Pop. (dist.) (1931 census) 186,500 (natives 182,200, Indians 780, Europeans 330).

Entellus Monkey, *Langur*, or *Hanuman*, the *Semnopithecus entellus* of India. Its body is from 2 to 4 ft long, and the non-prehensile tail is longer than the body. The general colour is a dirty yellow, but ^{grey} white. In character it is mischievous, noisy, and quarrelsome.

Entente Cordiale (literally means 'cordial understanding'), term applied to friendly relations existing between Powers, most often used of the friendship between Great Britain and France that began early in the 20th cent. and resulted in the alliance that carried on the First World War.

Enteric Fever, acute infectious fever caused by the species of bacteria known as the *Bacterium typhosum*. Of the species *B. typhosum* there are 2 main types—the

Salmonella typhi and the *Salmonella paratyphi*. These 2 are responsible for the E. F.'s known as *typhoid fever* and *paratyphoid fever*. *S. paratyphi* has 3 main sub-types known as *S. paratyphi* A, B, and C. Any of these types or sub-types may be the cause of an attack of E. F., and generally speaking the paratyphoids are clinically less severe than typhoid. In Britain typhoid and paratyphoid B are the E. F.'s most commonly seen. Paratyphoid A and C are rare but may be introduced by a patient returning from overseas. E. F. causes inflammation of the small intestine with ulceration, enlargement of the spleen, and the infection may spread to other organs and cause pneumonia, nephritis, or meningitis. The incubation period is about 2 to 3 weeks. At about the 8th day of the disease a fleeting eruption of rose-coloured spots occurs, mostly on the trunk. The symptoms are vague; headache is usual, the patient feels more prostrated than the symptoms would seem to warrant, there is vague abdominal pain, and constipation is more usual than diarrhoea. The temp. rises gradually but the pulse in the early stages tends to remain slower than is usual with a rising fever. The tongue is coated. Dangerous complications of E. F. are intestinal hæmorrhage, perforation of the intestine, and pneumonia. Gruber and Durham showed in 1896 that the serum of patients suffering from typhoid fever would agglutinate typhoid bacilli, and in the same year Widal and Seiard showed that a patient's serum could be tested with bacteria of a known type for the purpose of identifying the disease. The Gruber-Widal agglutination reaction is now the standard method of diagnosing E. F., as well as many other infections. The disease runs a slow course of from 4 to 6 weeks and convalescence is slow. Bacteria may remain in the intestinal tract of a patient after the clinical attack has resolved, and symptomless carriers of the infection are the source of many outbreaks of the disease. Carriers excrete bacteria in the faeces and in the urine and contamination of a vector (see INFECTION) easily occurs. E. F. is usually a food- or water-borne infection. Water supplies may be infected from faulty sanitation or directly from a carrier. Shell-fish may be infected from sewage effluent. Foods of any kind may be contaminated from the hands of a carrier, and milk and cream are media particularly favourable to the growth of the bacteria. Ice-cream has been the cause of many epidemics. Refrigeration does not kill *B. typhosum*, but boiling does. Flies are known to be vectors of E. F. Owing to better sanitation and more hygienic methods of preparing and handling food, E. F. is now uncommon in this country. Naturally enough it occurs more often in countries where standards of sanitation and hygiene are poor. The ravages of E. F. during wars was a stimulus to the discovery of therapeutic preventive measures. Almoth Wright developed from 1895 onwards his conception of active immunisation by

the use of vaccines made up of killed organisms. He satisfied himself that the inoculation of killed vaccine made the blood highly bactericidal to the *typhosum* bacillus and he urged that our armies overseas should be actively immunised. The War Office rejected his proposal, but a royal commission reversed this decision and typhoid inoculation became standard practice for the Brit. Army. The benefit was reaped in the First World War when the incidence of E. F. per 1000 men was 2.35 compared with 105 in the Boer War. Known as T.A.B. vaccine, it grants a high degree of immunity against typhoid and paratyphoid fevers A and B for about 2 years. Those living in countries where E. F. is endemic should be re-vaccinated at regular intervals, and those proceeding to such countries for the first time should also be vaccinated. Chloramphenicol, one of the antibiotic drugs (q.v.), is highly effective against typhoid and paratyphoid, with the result that for the first time the medical profession now has a specific treatment for E. F. Unfortunately, however, although curative of the disease, chloramphenicol does not appear to be effective in eradicating the infection in carriers. A register of typhoid carriers in this country is maintained by the Central Enteric Reference Laboratory.

Enteritis, inflammation of the intestine, i.e. of the small intestine. The inflammation may be caused by bacterial infections, as in typhoid fever (q.v.), or by bacterial toxins, as in food poisoning (q.v.), or by toxins produced by abnormal digestive fermentations, or by chemical irritants such as arsenic (q.v.). Offensive diarrhoea is a usual symptom of E.

Entertainments Duty. This duty, introduced in 1916, was charged on payments for admission to any entertainment, the only exemptions being in respect of schools, educational and scientific institutions, and charitable purposes.

The Finance Act, 1953, exempted amateur sport and cricket. It introduced 3 scales of duty: (1) live performances such as stage plays, ballet, concerts, etc.; where the payment for admission excluding the duty exceeded 1s. and did not exceed 1s. 5d., the duty was 4d. with an additional 1d. for every 5d. or part of 5d. over 1s. 5d.; (2) racing, games, sports, and other entertainments to which neither of the other 2 scales applied; where the payment exceeded 1s. and not 1s. 2d., the duty was 1d. with an additional 1d. for every 1d. or part of 1d. over 1s. 2d. (3) entertainments where performers were not actually present, e.g. cinema, 1d. where the payment did not exceed 9d., 4d. where it was 1s., 1s. 10d. where it was 2s. 6d., and so on. The yield from the E. D. was £40 million in 1950-7.

In 1957 the E. D.s on the theatre and sport were removed; the former had produced £2½ million a year, the latter £3½ million. The duty on the cinema was reduced by £6½ million (it yielded £34 million in 1956-7). A new excise duty of £1 was levied on the combined radio and

television licence, to yield £8 million a year. The cinema tax was also simplified: it was to be 50 per cent of the amount by which the total admission price exceeded 11d. The reduction in the cinema duty and the new television duty were justified by the Chancellor on the ground that they would apportion the tax on competing entertainments more fairly. Certainly the cinema has suffered from the competition of television (as have other entertainments and social amenities, such as the public house), and many cinemas were closed in the mid-1950's. But the remaining cinema duty may have been too large and the new television duty too small to produce conditions of equal competition.

Entomology (Gk *entoma*, insects; *logos*, a discourse), the science that treats of insects. The term is often loosely used to include the study of other small animals, such as centipedes and spiders. The science began with Aristotle, who differentiated a class of animals, *entoma*, and included in it the true insects, arachnids (spiders, scorpions, etc.), and myriapods (centipedes and millipedes). His grouping was followed for 2000 years. Modern E. has sev. branches, the chief being: (1) classification; (2) anatomy and physiology; (3) bionomics, or the study of habits and life-hist.; (4) embryology, or the study of development; (5) cytology, or the study of cells; (6) ecology, i.e. the relation to the habitat; (7) palaeoentomology, or the study of fossil insects. It had its beginning in the splendid work done in the 17th and 18th cents. Mention must be made of Malpighi's work on the silkworm (1669), Swammerdam's *Biblia naturae*, in which he showed the true nature of the larva of an insect, and of Redi, the Italian, who disproved the theory of the spontaneous generation of maggots. At the same time John Ray was working on the classification of insects, and was the first to reach the modern lines of arrangement. In 1735 Linnaeus, working on the lines laid down by Ray, made a new classification of insects, which is the foundation of all modern work. The work of classification has been carried on by workers of all nationalities, and is now very complex and accurate. The anatomical work of Malpighi and Swammerdam has had many followers, the field becoming so large that workers at the present time have to specialise very strictly. The most famous work is perhaps that of Lavigny, who estab. the homology of the jaws of all insects in 1816, showing that in every species the mouth parts consisted of 3 pairs of jaws, more or less modified, namely mandibles, first maxillae, and second maxillae (the last pair fused to form the labrum or lip). Amongst Eng. workers in insect bionomics should be mentioned W. Kirby, W. Spence, Lord Avebury, and Miall. Much useful work was done by the Amer. C. U. Riley on the habits of locusts and in his victory over the Phylloxera insect. The embryology, cytology, and ecology of insects and

palaeoentomology are essentially products of the last century, but already great strides have been made in these branches. Most of the recent embryological work has been done in Germany and the U.S.A. Brit., colonial, and Amer. entomologists have made considerable contributions to entomological cytology and ecology. Recognition of the economic importance of insects with regard to diseases of plants and animals has led to the appointment of gov. entomologists in the U.S.A., Canada, and Great Britain, and applied E. has made rapid progress during the present century.

As a result of the researches of many workers, notably Emin Pasha, Grassi, Laveran, Manson, and Ross, the mosquito was recognised in 1898 as a carrier of the malaria parasite. Subsequently mosquitoes have been proved to carry organisms causing elephantiasis, yellow fever, and Dengue fever. The most effective method of extermination is to render uninhabitable the swamps which form the breeding-places of the insect. In England, extensive work on mosquito control is being carried out at Hayling Is.

House-flies are other active agents in spreading disease. In feeding on refuse, they collect on their mouth parts and legs organisms which they deposit, when walking or feeding, on the food of man. In addition to various bacteria causing tuberculosis, typhoid fever, and other diseases, flies may carry eggs of the hook-worm and of other worms parasitic in man. The gad-fly and tsetse fly transmit disease directly to horses and cattle.

The irritation and disease caused by flies to the troops in the First World War stimulated efforts to exterminate these pests. The methods used include the exclusion of air from the eggs by closely trapping the larvae; the addition of borax or of powdered hellebore to the breeding-grounds; and the preventive measure of the immediate destruction of all refuse. In America, Africa, and Asia investigations are being made on the habits of insects injurious to cotton and tobacco plants, fruit trees, and forest trees of economic value. In many cases, spraying with appropriate solutions, or the introduction into the dist. of an animal which preys on the insect pest, is beneficial. Good results have recently been obtained with new insecticides, notably 'D.D.T.' and 'ganimethane'. In the Second World War the battle dress worn by Brit. troops was impregnated with D.D.T. as a protection against body lice, and similar methods enabled an outbreak of typhus amongst the civilian pop. of Italy to be brought quickly under control.

As a further instance, showing how a knowledge of insect habits and ecology has enabled control to be effected, reference may be made to the locusts, which have been famous for hundreds of years as agents of destruction and which occur in over 80 countries of all 5 continents. There are 8 or so species of locusts; in each of them (according to the theory first put forward in 1921 by Uvarov) there exist

various phases. In the *solitary phase* the insect lives isolated as a short-horned grasshopper; if however a number of these solitary forms breed under crowded conditions, they develop into the *gregarious phase*, which is the true locust and which migrates in swarms. The 2 phases may differ widely in appearance as well as in habits, and between the 2 extremes are numerous intermediate phases. The attention of entomologists is directed to preventing the development of the gregarious phase, or to destroying it when detected before migration can take place. The 'hoppers' (immature individuals with rudimentary wings) can be dealt with by driving them into pits or trenches, or by the use of poison bait containing arsenic, sodium silicofluoride or 'gammexane'; the latter substance is particularly useful, since it is rapid in its action and does not harm cattle. Flame throwers and dusting from aeroplanes are also used. For destroying the adult winged individuals there is at present no effective method available. These activities are controlled and co-ordinated by the govts. of the countries concerned, and by the Anti-locust Research Centre estab. in 1930 at the Natural Hist. Museum in S. Kensington.

Morgan and Bridges's work on the cytology and genetics of *Drosophila*, and Goldschmidt's investigations on the gypsy moth, have led to new developments in the relation of cytology to genetics and to the problems of heredity.

Attention has also been directed to the problems of insect physiology, e.g., the mechanism of flight, the process of respiration, insect behaviour and the working of the sense organs, especially the compound eyes. It has been shown also that metamorphosis is initiated by a hormone produced in the head and transported by the blood stream to the organs concerned.

E., beyond all other sciences, affords an opportunity for the amateur worker. The Société Entomologique de France and the Royal Entomological Society of London admit professional and amateur members. The insects when collected are best killed by prussic acid in some form. When they are relaxed they must be set. *Setting* consists of pinning the insect on to cork, the body of the insect lying in a groove in the cork, the wings and other parts being arranged in the best possible manner by means of needles or *setting bristles*. Paper braces are then put on to keep the whole in position, and the insect is thoroughly dried. It is then ready to put in the collection. See A. T. Gillander, *Forest Entomology*, 1912; J. H. Fabre, *The Life and Love of the Insect*, 1918; H. G. Feinold, *Applied Entomology*, 1921; A. Balochowsky and L. Meunil, *Insectes nuisibles*, 1936; M. Burr, *The Insect Legion*, 1939; V. B. Wigglesworth, *The Principles of Insect Physiology*, 1939, 1942; R. Frost, *General Entomology*, 1942; A. D. Imms, *General Textbook of Entomology*, 1925, and *Insect Natural History*, 1947. See also articles under industrial insects. For locusts see articles in

Endeavour, 1943, II., 56 and 1947, VI., 24. See also INSEKTS.

Entomostraca (Gk *entomon*, insect; *ostrakon*, shell), name given to a sub-class of Crustaceans, most of whose species are enclosed in a delicate, transparent, bivalve shell which can be opened or closed at the will of the animal. Many of them are very small, and are found in great numbers in stagnant, fresh, and salt water; some are parasitic. The E. comprise many thousand species which fall under 4 great orders, Phyllopoda or Branchiopoda (q.v.), Ostracoda, Copepoda, and Cirripedia (Barnacles).

Entophytes (Gk *entos*, within; *phuton*, plant), the term applied to certain plants, generally parasitic, which live inside other plants or inside animals. These are frequently harmless, but some have fatal results in animals, as is the case with many bacteria.

Entre Douro-e-Minho, former prov. of Portugal, bounded on the N. by the Minho and on the S. by the Douro (qq.v.). It is now divided between the provs. of Minho and Douro Litoral (qq.v.).

Entre Rios, prov. of the Argentine Rep., lying between the 2 rivs. Paraná and Uruguay. Some parts of this dist. are low-lying and marshy, but others are well-watered and fertile, so that the inhab. are chiefly engaged in cattle-rearing and agric. pursuits. Large tracts of the country are also covered with forests. Cap., Parana (q.v.). Area 28,500 sq. m.; pop. 790,000.

Entrecasteaux, see D'ENTRECASTEAUX.

Entremont, valley of the canton of Valais, Switzerland.

Entrenchment, general term applied to any earthenwork which is thrown up to protect soldiers against an enemy. Es may be made very hastily and simply, as in the case of the ordinary shelter trenches or slit-trenches, or they may be of a much more complicated and permanent nature. In the case of the former troops are provided with implements so that they can easily and quickly dig up the earth to form a parapet behind which they can take shelter and over which they can fire. Es are also so constructed that they do not form any obstruction to the artillery who may want to drive over the ground. See FORTIFICATION.

Entresol, in architecture, a low storey or part of a storey in a building, between 2 higher ones. The E. consists of a low apartment usually placed above the 1st floor; frequently between the ground floor and the 1st floor. Also called the mezzanine floor.

Entropion, curving in of the eyelids, the opposite of ectropion. It causes constant irritation by the eyelashes coming in contact with the eye, with resulting interference with vision. E. is often the result of chronic inflammation of the eyelids (see BLEPHARITIS).

Entropy, see THERMODYNAMICS.

Entry: 1. Taking possession by the legal owner of lands and tenements when another person is wrongfully in possession of them. Formerly E. could be effected

by force, but as this self-redress led to great abuses, forcible entries were, by 2 acts of Richard II, made punishable by fine and imprisonment. To establish forcible E. it must be proved that the E. was accomplished under circumstances of actual violence or terror, as e.g. by the use of unusual weapons, by a considerable number of persons, or with menace to life. Mere violence without such exceptional circumstances would amount to no more than trespass, giving rise to an action for damages. It is to be noted, however, that where possession has been obtained by a trespasser (as distinct from the position of a person who was rightfully in possession in the first instance but who subsequently became technically a trespasser through some default) the rightful owner, according to one decision, may use reasonable force in ejecting him, and need not appeal to the law for assistance. The remedy for forcible E. is either an action for damages, an indictment, or an information before justices of the peace. A forcible E. by more than 3 persons acting in concert might amount to and be punishable as a riot (q.v.). The Conveyancing Act, 1881, gives to a person entitled to any rent charge, or other ann. sum charged upon or payable out of land, power, if the sum or any part is unpaid for 40 days after falling due, to enter into possession of the land and take the income of it until all the arrears due at the time of E. and incidental expenses are paid. If he cannot enter peaceably his appropriate remedy is an action of ejectment (which has taken the place of the old remedy by *writ of entry*) to try the question of title. A valid E. to give possession must be upon some part of the property claimed, and it is safer for the person entering formally to declare that he takes possession of the whole.

2. In leases: Formerly, E. was necessary to complete the tenancy, and till E. a tenant had no more than what was called an *interesse termini* (a right to have the lands), which, however, was a transferable right, though it could be surrendered or released. But the doctrine of *interesse termini* was abolished by the Law of Property Act, 1925, and now all terms of years take effect from the commencement of the term without actual E. E. is also not necessary to complete a freehold title. As to a sheriff's power of E., see EXECUTION.

Enugu, tn of S. Nigeria, situated 151 m. from Port Harcourt. Notable as a coal-mining centre. The mine began to yield coal in 1915 and is owned and worked by the gov. Ann. production about 700,000 tons. E. has been the scene of serious riots. Pop. 51,000.

Enver Pasha (1881-1922). Turkish politician and leader of the 'Young Turks'. b. Constantinople. He early triumphed over Abdul Hamid (q.v.) in his agitation for the restoration of the Constitution of 1876, and was then sent to Berlin as military attaché. He was in command of an army corps in the Balkan War, 1913 (q.v.), and during the peace

negotiations brought about the assassination of the war minister, which office he then filled himself, and placed his adherents in the other important state offices, his purpose being to override any possibility of interference by the W. Powers. In the First World War he became the virtual ruler of Turkey so far as domestic affairs were concerned. After the collapse of Turkey he was condemned to death, but had already fled the country. In 1921 he joined the Basmachi movement directed against the Soviet regime in Central Asia and was killed near Stalinabad in 1922.

Environment, term applied to all conditions which are not part of the individual self of a person, and which tend to alter each individual, thus forming certain varieties and species. The E. may be physical, including such things as geographical or chemical conditions, the latter including the state of the air, the conditions of food, and many other such influences. There is also a social E. showing the influence of one individual upon another. This leads also to the estab. of new customs and new institutions, thus bringing about a new type of individual. See also EVOLUTION.

Envoy, see DIPLOMATIC SERVICE; PLENI-POTENTIARY.

Enzeli, see PAHLAVI.

Enzina, Juan del, see ENCINA.

Enzio (c. 1224-72), king of Sardinia and natural son of Frederick II. C. 1238 the title of King of Sardinia was conferred on him by his father, as well as that of vicar-imperial in Italy. In 1241 he was victorious over the Genoese fleet, but in 1249 was himself defeated and taken prisoner, spending the rest of his life in captivity at Bologna.

Enzymes, catalytic substances produced by the cells in vegetable and animal tissues which accelerate specific conversion of more or less complex organic material. E. are not living organisms but, though lifeless, they are made only from living matter. They are colloidal, nitrogenous substances. The number of individual E. is not known as every species of plant and animal possesses its own kind which do not correspond exactly to those in other species. Their main catalytic action is on carbohydrates, fats and proteins, breaking these up into simpler substances capable of being absorbed and used by the body. It was between 1860 and 1870 that Pasteur (q.v.) was working on the diseases of wine and discovered that alcoholic fermentation depended on the action of living yeast cells—an action which was later found to be due to an E. One of the earliest E. to be recognised was diastase, an extract of malt, which could change starch into dextrin and sugar. Other E. act by adding the elements of water to the substance being converted—a process known as hydrolysis. Some of these are concerned in the process of digestion (q.v.). Proteins are changed into peptones, tyrosin, and leucine by E. (pepsin and trypsin) of the gastric glands and pancreas; the fats are changed into

Eoanthropus

fatty acids and glycerine, or emulsified, and saponified by the steapsin of the pancreas; carbohydrates are changed into glucose with or without intermediate states by the ptyalin of the salivary glands, the amyllopsin of the pancreas, and invertase, maltase, and lactase of the intestinal glands.

Another class of E., the oxydases, have the property of effecting oxidation in the tissues and act as part of the process of respiration. E. are formed from precursors which in themselves are inactive. These precursors are known as zymogens. Thus pepsin comes from pepsinogen, trypsin from trypsinogen, etc. Under certain conditions, peculiar to each one, zymogens become active. This wise provision of Nature prevents tissues from being attacked by their own E. The clotting of blood, for instance, is brought about under certain conditions by an E., thrombin (q.v.), acting on fibrinogen to convert it into fibrin (*see* BLOOD). The precursor of thrombin is prothrombin or thrombinogen. If it were not for the special conditions governing activation of the E., the blood would clot within the blood vessels. Not only do zymogens require special conditions to become active but also, to make doubly sure, there appear to be antagonistic substances, or anti-E., which neutralise the action of E. Thus the inactivator of prothrombin is anti-prothrombin, and that of pepsin anti-pepsin, and that of trypsin, anti-trypsin, and so on. It is thought that the antibodies and antitoxins developed in the process of acquired immunity (*see under* PATHOLOGY) may also be of the nature of anti-E. Certain E. actions are reversible so that the change can proceed in either direction. In this way a balance is kept, the process being checked from going too far. How E. work is not known, but their action is certainly powerful. They each cause changes which can only be brought about by the chemist in the laboratory with the greatest difficulty. *See under* BIOCHEMISTRY: DIGESTION: FERMENTATION. *See* R. Clements, *Modern Chemical Discoveries*, 1954.

Eoanthropus Dawsoni, *see* PILTDOWN MAN.

Eocene, in geology, is the lowest of the 3 groups into which Lyell divided the Tertiary system. His classification, based on the relative percentages of recent species of mollusca contained, has been

Eocene

modified by Beyrich, who inserted the Oligocene group, to include strata formerly classed as Upper E. and partly Miocene. The E. and Oligocene are sometimes classed together as the Palaeocene or Older Tertiary. In W. Europe the E. follows the Cretaceous so abruptly as to suggest that a break existed between the Cretaceous and Tertiary periods. In Europe, and in America and New Zealand, the deposits merge into one another, and no sharp line can be drawn between Cretaceous and E. rocks. During E. and Oligocene times, the floor of the Cretaceous sea was upraised into low lands with lakes and estuaries. The colossal disturbances of the earth's crust, by means of which this upheaval occurred, continued throughout Tertiary time, great mt chains such as the Alps and Himalaya being formed. The Brit. E. strata are confined to the SE. of England, where they occupy 2 synclinal depressions in the chalk, viz. the London and Hampshire Basins. The deposits are marine and estuarine, consisting of clays, sands, and marls, and have been arranged in the sequence shown in the table below. Outside the typical area the E. rocks occur in patches. The deposits of Bovey Tracy in Devonshire have been referred by some geologists to the E., and by others to the Oligocene. In Antrim and the Inner Hebrides occurs a magnificent development of Tertiary volcanic rocks. These consist of sheets of basaltic lava into which granite and gabbro intrusions were emplaced, the whole being cut by families of dolerite dykes. Plants preserved between certain lavas indicate the Tertiary age of the igneous rocks.

Two great E. regions may be distinguished in the European area. The first, termed the Anglo-Gallic prov., includes the E. of the Eng. area, of N. France and of Belgium, and the similarity of the deposits points to the fact that this was one great tract of sedimentation. The second, the S. European or Alpine E. area, is much more extensive. It includes the whole of S. Europe, extends southwards into N. Africa, to the Sahara and Egypt, and stretches eastwards to the Himalayas, and through Java and Sumatra to the Philippines. There existed, then, over this great area, a huge sea (of which the Mediterranean is a remnant) connecting the Atlantic and Pacific Oceans, and out of which the Alps, the Pennines, and part of the Carpathians rose as is. In the

Upper Eocene	Upper Bagshot Sands	Barton Sands Barton Clays
Middle Eocene	Middle Bagshot Sands Lower Bagshot Sands (upper part)	Bracklesham Series (including the Bournemouth Beds and the Alum Bay Beds)
Lower Eocene	Lower Bagshot Sands (part) London Clay Oldhaven Beds Woolwich and Reading Red Thanet Sands	Bognor Series (equivalent of London Clay) Plastic Clays (similar to Woolwich and Reading Beds)

LONDON BASIN

HAMPSHIRE BASIN

water of this sea, the 'Mittelmeer,' massive systems of limestone were formed by Nummulites, a genus of gigantic disk-shaped Foraminifera, which attained a great development in early E. time. The nummulitic formations of N. Africa and India are very rich in fossils, yielding large corals of the reef-building type, molluscs, and echinoderms. The problematical 'Flysch' of the Swiss Alps or 'Macigno' of the Maritime Alps consists of thick grey sandstones and shales with scarcely any organic remains, and was formed by the wearing away of the mts raised early in the Alpine orogeny. Both 'Flysch' and 'Macigno' were folded and uplifted in mt chains formed later in the Alpine movements. The E. rocks of the Libyan desert, as well as being remarkably fossiliferous, are of special interest, since they show a perfect petrographical and



A FOSSIL OF THE EOCENE PERIOD
Palaeotherium magnum

palaeontological passage from the Cretaceous into the Tertiary beds in question. In N. America the E. rocks are mainly of the fresh-water type. The marine deposits are represented by the Alabama beds, and occur in the valley of the Mississippi from the Gulf of Mexico to beyond the mouth of the Ohio. On the Californian coast these marine E. rocks attain a thickness of 3000 ft. Over the Rocky Mt region, from Mexico to Brit. Columbia, is found the lignite-bearing, fresh and brackish water formation known as the Laramie beds. Deposits of a similar type are found between the Rockies and the Wahsatch Mts. i.e. in the waste known as the bad lands. In the Rockies these beds attain a thickness of 13,000 ft, and have been subdivided into the following divs.: (1) Wahsatch group; (2) Green R. group; (3) Bridger group; and (4) Uinta group. These rocks are of great geological importance because of their extraordinary richness in vertebrate and mammalian remains. The mammals suddenly developed during E. time, and are chiefly of the placental group, which preponderate at the present day. Preceding them, and making possible their rise, had come the flowering plants which emerged in the preceding Cretaceous period. The hoofed beasts or Ungulates were dominant, and were divided into 2 groups with paired and unpaired hoofs,

as representatives of which we may mention the 'Palaeotherium,' and the 'anthracotherium.' The Carnivores were represented by the primitive Creodonts, and Rodents and Insectivores have been found. Regarding the fossils of Invertebrates, we find that the Ammonoidea and Belemnites, which fl. in Cretaceous time, have wholly disappeared, and with them the sponges and the Hippuritidae. The great reptilian families which fl. from Triassic time onward are practically extinct during E. time. The Molluscoidea are represented by forms which exist at the present day and the Coelenterata by reef-building corals. The flora of the E. consisted mainly of Dicotyledons (tropical and subtropical forms), Monocotyledons (such as the Palms), and Conifers. See M. Gignoux, *Géologie stratigraphique*, 1923; C. Nevin, *Principles of Structural Geology*, 1931; R. Field, *Historical Geology*, 1933; S. Shand, *Earth Lore*, 1933; K. Mather and C. Roy, *Physical and Historical Geology*, 1934. See also EARTH; GEOLOGY; TERTIARY.

Eon de Beaumont, Charles Geneviève Louise Auguste André Timothée d' (Chevalier d'Eon) (1728-1810), Fr. diplomat, and trusted agent in Louis XV's secret service, serving him in Russia (1757), and in England (1762-5). In 1759 he fought bravely as captain of the Fr. forces in Germany. He had assumed woman's dress on his first mission to Russia, and after his return to France in 1777 lived as a woman, his true sex becoming a society wager, and E. doing nothing to dispel the gossip. He revisited England (1785), and lived there permanently after the Fr. Revolution. He d. in London. His political and historical essays appeared (1775) as *Loisirs du Chevalier d'Eon*. . . . See J. B. Telfer, *Strange Career of the Chevalier d'Eon*, 1885; A. Lang, *Historical Mysteries*, 1904; *his Life and Times* by O. Homberg and F. Jousselin, 1911; M. Coryn, *The Chevalier D'Eon*, 1932.

Eos, Gk goddess of the dawn (Lat. *Aurora*), daughter of Hyperion and wife of Tithonus.

Eosuchia, a primitive group of diapsidan crocodile-like reptiles from the Upper Permian and Triassic.

Eötvös, József, Baron (1813-71), Hungarian statesman and author, b. Buda, leader of the Liberal party (1844), and a supporter of Kossuth. He wrote the comedies *Kritikusok* and *Idzasulók*, and the tragedy *Boszú*, 1830-3. Of his novels, *Karthausi*, 1842, *A falu jegyzője* ('The Village Notary'), 1844-6, and *Magyarország 1514-ben*, 1847-8, are the most famous. He was minister of public instruction in 1848, and again in 1867, and did much to establish a national system of elementary education in Hungary.

Eötvös, Roland, Baron (1848-1919), Hungarian statesman and physicist, b. at Budapest, son of Baron József E. Educ. at Königsberg and Heidelberg. At Budapest: 1871, lecturer; 1873, prof. of experimental physics. From 1873 connected with Hungarian Academy of

Sciences; president from 1889. He made many curious discoveries with regard to gravitation and capillary attraction. He also constructed the double-armed torsion balance named after him, by means of which local variations in gravity can be detected. Life member of Hungarian House of Magnates. Minister of public worship and education, 1895-6.

Eozoon, peculiar structures first found in Pre-Cambrian limestones in Canada, and subsequently elsewhere. Thought to be organic in origin, and thus of great interest, as identifiable fossils are not generally found in rocks earlier than the Cambrian. Although E. structures resemble the Stromatopora, it is not certain whether they are organic, or concretionary structures unrelated to any form of life.

Eporidaceae, a family of dicotyledonous plants closely allied to the Ericaceae (heather family) with the small-leaved genera of which they agree in habit, and from which they are scarcely distinguishable. They are to be found wild in Australia as shrubs with alternate or occasionally opposite leaves, and in Brit. greenhouses are cultivated for their showy flowers. Two of the chief genera are *Eparcis* and *Dracophyllum*.

Epaot. The synodic month—the period from new moon to new moon—is 29.530588 days (see MONTH), so that 12 synodic months are 354.36708 days, which is nearly 11 days less than an average solar year. For this reason the age of the moon on 1 Jan. becomes 11 days greater from one year to another. This age has been called the E. and it is important in calculating the date of Easter. The Roman Misal and the Book of Common Prayer give rules for finding this date (see GOLDEN NUMBER).

Epaminondas (c. 418-362 BC), Theban gen. and statesman, of a poor but noble family. After the Thebans had recovered the 'Cadmeia' and expelled the Spartans (379), he speedily became a democratic leader, and was sent to represent Thebes at the Spartan Congress (371). He refused to surrender the Boeotian cities, aiming at a Boeotian confederacy under Thebes. War followed, and the Spartan supremacy was crushed at Leuctra (371). With Pelopidas he invaded the Peloponnese, restored Messenia's independence, and founded Megalopolis (Arcadia) (369). During a fourth invasion of the Peloponnese E. was slain in the Theban victory at Mantinea (362). E. was renowned for his integrity in both public and private life, and made important innovations in military tactics.

Epaulement, a part of siege-works or a covering mass in military fortifications, raised to protect the troops from the enemy's fire. It differs from a parapet in making no provision for firing over it by the defenders. Siege batteries are usually shielded by one so constructed as to form an obtuse angle with the main line of battery, protecting the gunners from flank fire. It is used in general of any screen designed to protect the troops.

Epaulette, or **Epaulet**, a fringed shoulder-piece or ornamental badge of rank worn as part of a uniform, especially naval or military. It was adopted by commissioned officers in the Brit. Navy (1795), and is usually of gold bullion with various devices and embroidered designs to mark the degree of rank. Formerly E.s were worn by nearly all armies and navies, but after 1855 they were no longer worn in the Brit. Army by all ranks, and in U.S.A. only general officers of the army wore them after 1872. After the Russian Revolution of 1917 E.s were discontinued in the Red Army, but were restored before the Second World War. See UNIFORMS.

Epée, **Charles Michel, Abbé de l'** (1712-1789), Fr. Jansenist and educationalist, b. Versailles. One of the founders of the system for instructing deaf-mutes largely by means of the manual alphabet and signs. He founded a school for the purpose (1755). His *Dictionnaire général des signes* was completed by Abbé Sicard. See HVES by Morel, 1833; Berthier, 1852; and Valette, 1857; and P. Schumann, *Geschichte des Taubstummenwesens*, 1940.

Epéhy, **Battle of**, see FLANDRE AND FLANDERS, FIRST WORLD WAR CAMPAIGN IN—1918.

Eperjes, see PREŠOV.

Epernay (Aguas Perennes), Fr. tn. cap. of an arron., in the dept of Marne, on the Marne. It suffered in the Hundred Years War, was burnt by Francis I in 1544, and was badly damaged in the First World War. It is an important entrepôt for champagne wines, and has famous wine cellars 30 m. long hollowed out of the hillsides. Nearby is the ruined monastery of Dom Perignon, reputed inventor of sparkling champagne (see CHAMPAGNE WINES). E. has textile and sugar manufs. Pop. 19,800.

Ephemeris, a table stating for successive days, or sometimes shorter or longer intervals, the predicted position of, and other particulars concerning, heavenly bodies. The *Astronomical Ephemeris*, or *Nautical Almanac* of the U.K. is pub. annually, containing ephemerides of the chief stars and planets, and data of eclipses. France, Germany, Russia, Spain, U.S.A., and other countries issue similar almanacs.

Ephemeroptera, an order of insects, often known as Day-flies or May-flies, which somewhat resemble dragon flies, and as adults live only for 1 day. They have a nymph phase in water, sometimes lasting for 2 or 3 years. The insect as it emerges from the water is called the 'sub-imago,' and after shedding its delicate covering becomes a full-grown 'imago.' They haunt riv.-banks and ponds on summer evenings. The sub-imago and imago are used as baits by anglers, and called 'green drakes,' and 'grey drakes' respectively. *E. vulgata* is the best-known species. Other genera of May-flies are *Palingenia*, *Cloë*, *Cænis*, and *Heptagenia* or *Bætis*.

Ephesians, Epistle to the, a letter bearing the name of St Paul, addressed to the Christians at Ephesus, one of the chief cities of Asia Minor, at which the Apostle

had spent 2 years (Acts xix. 8 ff.) on an earlier occasion. The tone of the epistle, however, shows no restriction to a local church, and this, coupled with the facts that the words 'at Ephesus' in the first verse are omitted in some MSS., and that there is no reference to individual Ephesians, has led to the hypothesis that the letter is indeed a general epistle, an encyclical, cf. Col. iv. 16. The date of the epistle is usually placed during St Paul's imprisonment at Rome, about AD 60-65, and there is now substantial agreement as to its authenticity. The subject of the letter, the mystic unity of the Church in Christ, closely resembles that of the Epistle to the Colossians, a fact which supports the theory which makes them almost contemporary. See J. Robinson, *Ephesians*, 1914; H. Bate, *Guide to the Epistles of St Paul*, 1926; E. Goodspeed, *The Meaning of the Ephesians*, 1933; L. Chafer, *The Ephesian Letter*, 1935; F. Syngo, *St Paul's Epistle to the Ephesians*, 1941.

Ephesus, anct city of W. Asia Minor, probably founded about the 11th cent. bc. Its ruins still exist on the banks of the Cayster, near the Gulf of Scula Nova, 35 m. from Izmir (Smyrna). It was chief of the 12 Ionic colonies from Greece, situated in Lydia. E. was subject in turn to Croesus (560 bc), the Persians (479-387), Athenians, Macedonians, and Romans. It was noted for its temple and worship of Artemis. This temple, built in the 6th cent. bc, was burnt down by Herostatus on the night of Alexander's birth. Restored by the Ionian states, it was considered one of the wonders of the world; it was destroyed by the Goths (AD 263). Besides its ruins, there are interesting remains of a fine theatre, odeum, and stadium. Excavations have been systematically carried on only since the 19th cent. (c. 1874) by the Austrian Archaeological Institute, and by Wood and Hogarth for England. E. was the bp. of Heraclitus, scene of the Legend of the Seven Sleepers, and seat of the Ionian school of painting. St Paul visited it sev. times (see Acts xviii. xix.). The railway from Smyrna to Aidin passes the anct site, and Ayasuluk is the chief vil. near it. See E. Falkner, *Ephesus and the Temple of Diana*, 1862; J. T. Wood, *Discoveries at Ephesus*, 1877; J. Ferguson, *Temple of Diana*, 1883; D. Hogarth, *Excavations at Ephesus*, 1908; G. Cummins, *The Great Days of Ephesus*, 1933.

Ephesus, Councils of. The 3rd ecumenical council, convoked by Theodosius II, under the presidency of Cyril of Alexandria, AD 431, was notable for the attendance of papal delegates from Rome, who were instructed to adjudicate on the opinions of the Council, but to abstain from debate. This Council condemned the heresy of Nestorius, but did not itself explicitly define the orthodox doctrine. Theodosius also convoked the 'Robber' Council of AD 449 held under Dioscurus of Alexandria, which restored Eutyches as archimandrite and priest, from which

office he had been driven by the Synod of Constantinople, and deposed Flavian, the Patriarch.

Ephialtes: 1. The Malian traitor, who showed the Persians the mt defile of Anopaea. Following this, they came up behind Leonidas and his Spartan band and overcame them at the Pass of Thermopylae (480 bc).

2. Athenian statesman, political friend of Pericles, and opponent of Cimon. He helped to pass democratic reforms (c. 462 bc), and limited the power of the Areopagus (461).

3. A son of Poseidon and Iphimedeia, one of the giants who revolted against Zeus, piling Pelion upon Ossa to invade heaven. See ALQIDAE.

Ephod (perhaps from Heb. *aphad*, to put on, clothe): 1. A Jewish priestly vestment. That worn by the high-priest was of blue, purple, scarlet, and fine linen (byssus) interwoven with gold. The garment was of blue, with embroidery in the colours around the bottom; the neck was round and bound with material. The E. was sleeveless, with buckles of onyx stone on the shoulder-straps, the names of the 12 tribes being inscribed, 6 on each buckle. In front the high-priests wore a jewelled breastplate of the same material as the E., containing a pouch for the Urim and Thummim; gold chains were threaded through gold rings on the breastplate to bind it to the rings on the shoulder-straps of the E. Similar garments of plain linen were apparently worn by any servant of the temple. See Exod. xxviii; 1 Sam. ii. 18, xxii. 18; 2 Sam. vi. 14.

2. Apparently an image, part of the equipment of a sanctuary. See Judges viii. 27, xvii. 5, xviii. 17; 1 Sam. xxi. 9, xxiii. 6.

Ephori, or **Ephors**, chief magistrates of the anct state of Sparta. They were 5 in number, and were elected by and from the people without any qualification of age or property. Their authority gradually widened until it included a superintendence over the whole commonwealth, including the kings, and they had the right of calling them to account for their actions and of punishing them with fines and reprimands, and even of prosecuting them before the gerousia.

Ephorus (fl. c. 340 bc), Gk historian, b. Cyme, Asia Minor. He was the author of a universal hist., which treated the hist. of the Gk and barbarian world, during a period of 750 years, ending in 340 bc. It was much read, and in spite of hostile criticism was used by many later historians, among them Polybius. See J. Jacoby, *Fragmente der griechischen Historiker*, vol. II, 1926.

Ephraem Syrus, St (fl. 370), b. Nisibis, and spent the early years of his life there in study, but after its surrender to the Persians by Jovian in 363 went to Edessa. Here he apparently lived as a hermit outside the city, teaching and writing. Ordained deacon, he refused any further promotion. During the famine in Edessa he urged the rich to deny themselves for their brethren's good. He wrote in

Syriac theological treatises, epistles and addresses to monks, apophthegms, homilies on Scripture and O.T. characters, and hymns. They were highly esteemed and most of them were trans. into Lat. and Greek. The standard ed. of his works is that of Assemani (Rome, 1732-46). An Eng. trans. of some of his pieces was pub. by H. Burgess in 1853. Rom. Catholics count him among the Doctors of the Church. See J. B. Morris, *Select Works of St. Ephraem*, 1847; H. Burgess, *St. Ephraem's Republic of Nineveh*, 1853; C. Emereau, *St. Ephraem le Syrien*, 1919; F. C. Conybeare, *St. Ephraem's Commentary on Acts*, 1926.

Ephraim, younger son of Joseph, blessed by his father above his elder brother Manasseh, and ancestor of the tribe of E., which with the tribe of Manasseh formed the 'house of Joseph' (Joshua xvii. 14; 2 Sam. xix. 20). The tribe of Benjamin earlier separated from them. E. was the chief of the tribes of the N. kingdom, and its name is often used for all Israel. The tribe was warlike (Judges viii. 1, and xii. 1 ff.), and produced Joshua.

Epiblast, see EMBRYOLOGY.

Epic (Gk *epos*, word, song), a long poem that celebrates in the form of a continuous narrative the achievements of a heroic personage of hist. or legend. E. poetry is typical of the early stages of literature. In Greek the *Iliad* and *Odyssey*, in Lat. the *Annals* of Ennius, in Eng. *Beowulf*, are among the earliest substantial compositions that have survived. Homer's poems were the choicest part of a vast collection termed the Cyclic Poems and comprising many works on the story of Troy and the almost equally famous story of Thebes. Greatest of all E.s of any age, the *Iliad* and *Odyssey* have been accepted as models for this type of literature. They possess what have come to be regarded as the essential E. qualities—unity of action, rapidity of movement, the use of the supernatural and, above all, an inherent dignity and grandeur of conception and narration. Among the Greeks Homer's poems were regarded with something of the reverence that the O.T. commands with us. Later and inferior Gk E. poets were Apollonius of Rhodes (3rd cent. bc) who wrote the *Argonautica*, and Quintus of Smyrna (4th cent. ad) whose *Posthomerica* deals with part of the Troy story between the *Iliad* and the *Odyssey*.

Rom. E., derivative like nearly all Rom. poetry, began with Livius Andronicus, who trans. the *Odyssey* in the 3rd cent. bc. Contemporary with him was Naevius, who wrote in Saturnian metre on the Punic Wars, and was followed by Ennius (239-169 bc), who composed a hist. of Rome in E. verse. In Lat. E. Virgil (70-19 bc) stands supreme, as great a master of the artificial or literary E. as Homer was of the original type. In the Silver Age of Lat. literature the cult of rhetoric gave rise to a number of E.s, of which the most important are Lucan's *Pharsalia* on the Rom. civil wars, the *Argonautica* of

Valerius Flaccus, the *Thebaid* and *Achilleid* of Statius, which were greatly admired in the Middle Ages, and the *Punica* of Silius Italicus, which tells of Rome's wars with Hannibal. All these writers belonged to the 1st cent. ad.

The golden age of Indian E. falls in the 4th and 5th cents. with the composition of the Hindu *Mahabharata* and *Ramayana*. Later, in medieval Europe, legends clustering round the names of historical personages like Alexander or Charlemagne or of national and sometimes mythical heroes such as Siegfried or King Arthur, became in many instances moulded into poems of E. type. Of the Teuton lays the *Nibelungenlied*, telling the story of Siegfried, takes rank as one of the greatest of poetic romances, and has even been compared with the *Iliad*, not for beauty of style, but for human interest and effectiveness as a narrative. Among the greatest of Icelandic sagas, which in unrhymed poetry related early Norse hist. and legend, are the stories of *Burnt Njal*, *Grettir the Strong*, and *King Olaf*. France also had its E. song cycles telling of national heroes, the *Chanson du Roi*, for example, relating the legends of Charlemagne and his followers. To this set belong the *Chanson de Roland*, *Ogier the Dane*, and other great lays. The great E. of Spain is the *Poem of the Cid*, written in the 12th cent. about a national hero who lived in the 11th cent.

Italy was very rich in E., beginning with Dante's magnificent *Divina Commedia*, 1320, written in terza rima and carrying on, in its 3 divs., *Inferno*, *Purgatorio*, and *Paradiso*, the tradition of Virgil, who appears as a character in its pages; it is the first Renaissance composition that can bear comparison with the classical E.s. Later It. writers created a romantic type of E., seen at its best in Ariosto's *Orlando Furioso*, 1516. A more orthodox and powerful example of E. was Tasso's *Gerusalemme Liberata* (Jerusalem Delivered), 1575, which was for long the most popular work in It. literature. About the same time Camoens wrote *Os Lusíadas*, 1572, the great Portuguese E. describing the discovery by Vasco da Gama of the sea route to India, and celebrating by narrative and prophecy the whole hist. of Portugal.

Eng. literature has the distinction of possessing in *Beowulf*, which belongs to about the 7th cent., the earliest E. in any modern language. As a poem it cannot compare with the *Iliad*, but it has this in common with Homer's work, that it is a natural production, not an artificial work of scholarship and study. After it there is a gap of many centuries before we come to Spenser's *Faerie Queene*, 1590, which, if not an E. in the strictest sense, possesses many E. qualities. In Milton's *Paradise Lost*, 1667, Eng. E. reaches its supreme height; no other Eng. poem can compare with it in loftiness of theme and magnificence of diction. The 17th cent. produced sev. other E.s, such as Davenant's *Gondibert*, 1651, and Cowley's *Davidis*, 1656, but they are now mercifully

forgotten. In the 18th cent. *Fingal*, 1762, a prose E. claimed to be the work of Ossian, gained temporary celebrity. The Romantic Revival produced in Keats's *Hyperion*, 1818, an E. fragment of great power, while later in the same century Matthew Arnold's *Balder Dead*, 1853, and Morris's *Sigurd the Volsung*, 1876, reproduced the spirit of Norse E. The 20th cent. may claim Hardy's drama *The Dynasts*, 1908, which, though not strictly an E., belongs to the same genre.

See separate articles on the authors cited; also G. Murray, *Rise of the Greek Epic*, 1924; E. Nitchie, *Vergil and the English Poets*, 1919; W. P. Ker, *Epic and Romance*, 1897; J. Clark, *History of Epic Poetry*, 1900; W. M. Dixon, *English Epic and Heroic Poetry*, 1912; L. Abercrombie, *The Epic*, 1914; and E. M. Tillyard, *English Epic Tradition*, 1926. For burlesque E. see MOCK-HEROIC POETRY.

Epicharmus (c. 530-440 BC), Gk writer of comedies, b. in the is. of Cos. He spent the earlier part of his life in the study of philosophy, and did not begin writing comedies until his removal to Syracuse in 484. Of these 35 are extant, written in the Doric dialect, and to him is due the literary form of the Sicilian comedy. He introduced a regular plot and did away with the low buffoonery then current for comedy in Sicily. He took his subjects from the stories of gods and heroes as well as from life, and his plots seem to have been simple and the action rapid. See G. Norwood, *Greek Comedy*, 1931.

Epictetus (c. AD 55-c. 135), Gk philosopher, b. Hierapolis in Phrygia. He lived a long time in Rome as a slave in the house of Epaphroditus, a favourite of Nero. Receiving his freedom, he became a prof. of the Stoical system, which he learned from the lectures of Musonius Rufus. He taught first at Rome, but after the expulsion of the philosophers by Domitian in AD 94, went to Nicopolis in Epirus. Here he appears to have spent the rest of his life, for the discourses which Arrian took down in writing were delivered by E. when an old man at Nicopolis. He was favoured by the Emperor Hadrian, but little else is known of his life, except that he was lame and very poor. He formed numerous disciples by free conversations after the manner of Socrates, and one of these, Arrian, compiled the short manual *Enchiridion*, which bears the name of E. He also wrote the philosophical lectures of his master in 8 books, from which some account of his doctrine may be gathered. The main point on which he laid stress was the independence of the human mind of all external circumstances, such being not in our power. This freedom is to be attained by patience and renunciation. The duty of man is to find all his happiness within himself, and the power of which he should be most sure is the deity in his own breast. For an account of his teaching, see E. A. Abbott, *Silvanus the Christian*, 1906. The chief ed. of the works of E. is that of J. Schweighäuser (6 vols., 1799-1800; Eng. trans. by Elizabeth Carter, 1758, and G. Long, 1877). See also eds.

by H. Schenkl, 1894, 1898, and by P. Matheson, 1917. There are studies by A. Bonhöffer, 1890-1911, and T. Colardeau, *Étude sur Épictète*, 1903.

Epicureanism, system of philosophy in which human happiness was regarded as the highest good. It was founded by Epicurus, who claimed to be independent of all his predecessors, but he was in reality indebted both to the Cyrenaics and to Democritus. His system, however, differed from that of the Cyrenaics in his conception of pleasure. This he regarded as something lasting and imperishable, consisting in pure and noble mental enjoyments, i.e. in the freedom from all influences which disturb our peace of mind, and thereby our happiness. His *summum bonum* was peace of mind, and this he based upon *phronesis*, which he described as the beginning of all good and the origin of all virtues. In his physics he followed the materialistic system of Democritus, and his views are set forth in the *De Rerum Natura* of Lucretius. According to him we obtain our knowledge of things from *eidōla* or images of things which are reflected from them and pass through our senses into our minds. Of the gods, too, he considers we obtain our knowledge in the same way, and he regards them as enjoying perfect happiness which would be interrupted if they took part in the gov. of the world, therefore they exercise no influence upon the world of man. Epicurus had numerous pupils who propagated his doctrines, and yet no system of philosophy has been so much attacked as his. This was probably owing to a great extent to the conduct of the men who called themselves Epicureans, and gave themselves up to the enjoyment of sensual pleasures. The word 'epicurean' survives in the speech of modern Palestinian Jews in the form of *Epikoris*, a term of opprobrium applied to apostates from the ancestral faith. See J. Watson, *Hedonistic Theories*, 1895; W. Pater, *Marius the Epicurean*, 1913 (Everyman's Library, 1934); A. Keim, *L'Epicurisme*, 1924.

Epicurus (341-270 BC), Gk philosopher, founder of the Epicurean school, which was named after him (see EPICUREANISM), b. Samos, where he spent the first 18 years of his life. He began the study of philosophy at an early age, and in 310 began to teach first in Mytilene and afterwards in Lampsacus. In 306 he went to Athens and purchased a garden, the famous *Kēpoi Epikourou*, in which he estab. his philosophical school. Here, surrounded by his friends and pupils, and 3 brothers, Neocles, Charidemus, and Aristobulus, he spent the rest of his life engaged in the study of philosophy. E. was a materialist. He taught that man's duty was to attain personal happiness and peace of heart by overcoming irrational desires and fears. Although he appears to have been a prolific writer and, according to Diogenes Laërtius, was the author of 300 vols., all that remains of them are some fragments of his great work *On Nature*, 3 letters, besides his will and a

compendium of his doctrine in 44 short propositions, written for his scholars to learn by heart. The extant remains have been ed. with a trans. by C. Bailey, 1926. See C. Bailey, *The Greek Atomists and Epicurus*, 1928; E. Zeller, *Stoics, Epicureans, and Sceptics*, 1880; W. Wallace, *Epicureanism*, 1902.

Epicycle, in unct astronomy, a small circle the centre of which was supposed to move on the circumference of a larger one called the 'deferent.' It was used for representing the motions of the planets as well as of the sun and moon, the deferents of which were circles, the earth being their centre. See PTOLEMAIC SYSTEM.

Epidamnus, see DURAZZO.

Epidaurus: 1. Tn of anct Greece, situated on the Saronic Gulf, on the E. coast of Peloponnesus in a dist. called Argolis



E.N.A.

EPIDAUROS: THE THEATRE

under the Romans. It was famous as the chief seat of the worship of Aesculapius. The temple of this god lay on the highway to Argos, 5 m. W. of E., and was frequented by patients from all parts of the Hellenic world. A few ruins are still extant, and the sacred enclosure is even now called Hieron or the Sanctuary. The remains of the theatre (4th cent. bc) are well preserved.

2. See DUBROVNIK.

Epidemic, general term signifying common to, or affecting, a whole people, or many people; prevalent; general. It

is applied to mental, moral, social, and physical phenomena, as an E. of suicide, E. folly. Technically, in sanitary science, it means a contagious disease, or generally a wide-spread disease. The term E. is equally applicable to disease occurring both in men and in animals. It has the advantage of directing attention to the fact that a disease affecting but few individuals in any one locality may have a very wide distribution, as E. meningitis and other diseases, which require administrative measures for limiting and eradicating a disease. Diseases caused by lack of vitamins, such as scurvy and beriberi, often assume E. forms. The term E. is a disease coming on a people, and is used in contradistinction to endemic (q.v.), a disease in a community. When an E. spreads quickly over whole countries or expanses of the earth, affecting large numbers of the pop., it is known as a *pandemic*. Such were the influenza E.s of 1918 and 1957.

Epidemic Haemoglobinuria, see BLACK-WATER FEVER.

Epidemiology, the science of epidemics, and concerned with the cause, infectivity, epidemic, and pandemic manifestations of infective diseases, and their prevention. Epidemics and pandemics result from the conjunction of 3 essential factors: (1) an available store of organisms causing the disease; (2) effective transmission of these organisms in sufficient numbers; (3) other individuals with tissues susceptible to the organisms. Many secondary factors also operate, and the effect of an infective disease on individuals may depend on age, sex, relative immunity, climate, and other conditions. The co-operation of doctors, bacteriologists, pathologists, and statisticians is essential to advancement of E. Observations on the interaction of host and parasite (see PARASITE) are made, and the discovery that healthy people may act as carriers and may distribute organisms causing infectious diseases was one of the most important during the present century. The scientist who observes the life hist. and reactions of these organisms contributes facts on which preventive measures can be based, and the statistician analyses such large numbers of results that he can detect, and sometimes correct, possible errors in observations and records. Curves obtained by graphing statistics sometimes make it possible to predict the probable course of an epidemic and its probable periods of recrudescence. Application of the results of E. have always made it possible to prevent the occurrence of many infective diseases, and have led to the virtual disappearance of some infectious diseases in civilised countries. The World Health Organisation (q.v.) carries out epidemiological research and transmits epidemiological information on a world-wide scale. See C. O. Stallybrass, *The Principles of Epidemiology*, 1931; M. Greenwood, *Epidemiology: historical and experimental*, 1932; *Epidemiological Report* (League of Nations), 1934; C.-E. A. Winslow, *The Conquest of*

Epidemic Disease, 1943; *Official Records of World Health Organisation* (W.H.O., Geneva).

Epidermis, see SKIN.

Epidiasscope, magic lantern combined with an episcopes which can project opaque as well as translucent pictures. An episcopes projects only opaque pictures.

Epidote, mineral of a green or grey colour, which is composed of silica, alumina, lime, oxide of iron, and oxide of manganese. Fine crystals, 3 in. in length, are found at Arendale in Norway, and also in Sweden and at Franconia in New Hampshire; and some good specimens come from Piedmont.

Epiglottis, leaf-like lid of yellow fibro-elastic tissue which covers the glottis (the opening of the larynx) during the act of swallowing. A long stalklike ligament (the *thyro-epiglottidean*) connects it inside the larynx with the thyroid cartilages.

Epigoni, descendants of the seven who d. before Thebes. Ten years later the E., attacking Thebes to avenge their fathers, took the city and razed it to the ground. Their names are not identical in all accounts, but usually include Alcmaeon, Aegialeus, Diomedes, Promachus, Sthenelus, Thersander, and Euryalus. See SEVEN AGAINST THEBES.

Epigram (Gk *epi*, upon; *graphein*, to write), originally meant an inscription, such as was put upon a tomb or a statue. Among the earliest are those of the Gk Simonides of Ceos, who wrote epitaphs in elegiac couplets for the Greeks who fell in the Persian wars, a typical example being his couplet on the battle of Marathon: 'Fighting for Greece, the Athenians at Marathon laid low the might of the gilded Medes.' From this early use E. came to mean a miniature poem summing up in pointed phraseology a single thought or situation. The famous Palatine Anthology contains some 4000 Gk E.s ranging in date from 700 BC to AD 1000. In Rom. literature the witty or satirical turn which appears frequently in Gk E.s became almost the rule, reaching its height in the clever but often scurrilous E.s of Martial. Among Eng. poets the richest in E.s is Pope; they commonly form a part of longer poems, but some stand by themselves, such as:

'You beat your pate and fancy wit will come:

Knock as you please, there's nobody at home.'

Eng. E. may be said to have begun with John Heywood, who was followed by Ben Jonson, Donne, Herrick, and others. In the Augustan age Prior, who shows skill comparable with Pope's, Swift, Goldsmith, and Garrick all used the E. effectively. In the 19th cent. may be mentioned Byron, Thomas Hood, Moore, and Coleridge, who hit off the E. itself in a neat couplet:

'What is an epigram? A dwarfish whole,
Its body brevity, and wit its soul.'

The highest poetical level in Eng. E. may be claimed for Landor, who attained something approaching the telling simplicity of the Greeks in such pieces as:

'I strove with none, for none was worth
my strife;

Nature I loved; and next to Nature,
Art;

I warm'd both hands before the fire of
life;

It sinks, and I am ready to depart.'

Among modern writers who have used the form effectively have been Sir Win Watson, Kipling, Belloc, and Sir John Squire.

As a rhetorical term E. is used of a short, pointed saying which arrests attention by its cleverness; often it is based on antithesis, as in Pope's line 'For fools rush in where angels fear to tread.' As examples of modern E.s we may quote Oscar Wilde's saying, 'Experience is the name everyone gives to his mistakes,' and Bernard Shaw's 'Home is the girl's prison and the woman's workhouse.'

See J. W. Mackail, *Select Epigrams from the Greek Anthology*, with trans., 1890; W. D. Adams, *The Book of English Epigrams*, 1878; also FIGURE OF SPEECH.

Epigraphy, a science dealing with the study of ancient inscriptions, including their decipherment and interpretation. It is mostly concerned with inscriptions on hard materials, such as stone, metal, bone, shell, and wood, or materials which may become hard, e.g. clay. It may include incidental scratchings, such as *graffiti* like those on the walls of Pompeii; but writings on flexible materials such as parchment and paper are the prov. of palaeography (q.v.). E. is subdivided into Greek, Lat., Semitic, and other branches.

Epilepsy, recurring attacks of loss of consciousness accompanied by generalised convulsions. The convulsions are first of the tonic, rigid type (lasting a few sec.) followed by the clonic, jerking type (lasting for a few min.). The face is congested and blue in the tonic stage, due to temporary inhibition of respiration, and there is frothing at the mouth. Unconsciousness or a stuporous state may last for some time after the fit is over. The patient when he comes round is often unaware that anything untoward has happened. A fit is often preceded by an aura (q.v.). Incontinence of urine frequently occurs. E. as a rule first shows itself in childhood or adolescence. It may be hereditary. The cause is unknown but liability to fits depends upon some innate or constitutional flaw in the brain as a result of which the nerve cells are apt to discharge in an explosive way without apparent reason. In most cases the liability to fits is slight and may be kept under control by drugs, although the constitutional flaw cannot be eradicated or cured. In other cases the fits may continue but, with treatment, are infrequent and interfere little with the patient's life. The proportion of serious cases in which, despite treatment, the fits continue to be frequent is small. *Petit mal* or *minor E.* is a very mild form of E. in which the loss of consciousness is momentary, amounting to no more than a fleeting vacancy of expression and irresponsiveness to conversation, or whatever

may be happening, and sometimes faint twitching of the face or limbs. The epileptic so far as possible should lead a normal life. Those around him should be aware of the nature of the complaint and the successful management of a case depends a great deal on their sensible co-operation. Epileptics should not be in a position to harm themselves or others should they have a fit. They should not drive cars or public transport vehicles for obvious reasons, and for their own sake they should not ride bicycles or swim unless carefully watched. Naturally the choice of work open to epileptics is limited by their disability. Shortage of sugar is apt to precipitate an attack and epileptics should not go too long without food and should carry sweets or sugar in their pockets. Too much fluid and particularly alcohol is apt to precipitate a fit. Likewise overtiredness is a predisposing cause. E. should always be treated under medical direction and with the modern drugs (troxidone, 'epanutin,' and phenobarbitone) now available there is every prospect of controlling the fits in most cases and for the patient to lead a useful and full life within certain limits already referred to. Patients severely handicapped by the disease may be better admitted to an epileptic colony (q.v.). Anti-convulsant drugs given in epilepsy do not cause mental deterioration beyond an occasional drowsiness. Severe E., however, is apt in the course of time to cause some damage to the brain and dulling of mental acuity. Also, in the stage of post-convulsive stupor, patients sometimes perform automatic acts outside their knowledge or conscious control. E. is sometimes put forward as a defence in criminal proceedings. The risk of transmitting E. to children is serious only if there is an inherited tendency on both sides of the marriage. By means of an electrical recording of the brain impulses with a machine known as the electroencephalograph it is usually possible to tell whether a person is liable to transmit the tendency even though not having any personal or family hist. of the disease. Persons liable to transmit the tendency, or who are epileptics themselves, show an abnormal tracing on the electroencephalograph. *Jacksonian E.* is the term used to describe epileptic seizures due to a lesion of the cortex of the brain causing irritation to the motor cells. Brain tumours, displaced fragments of fractured skull and gunshot wounds are common causes of Jacksonian E. If the cause can be removed cure results.

Epileptic Colonies. C. for the care and training of E.s. The idea was first conceived in 1887, and since that date numerous C. have been formed in various countries. The first distinct attempt to provide for E.s was inaugurated by a Lutheran pastor, Friedrich von Bodelschwingh, who founded at Bielefeld in Westphalia, Germany, the Bethel Colony, which has grown to be a vil. inhabited solely by E.s. Here everything has been provided to meet their special needs. There are

schools and industrial teachers, and physicans to study and treat their cases. Outdoor occupations are provided, special diet is arranged for, and there are all sorts of recreations and amusements. The first colony founded in England was at Chalfont in 1893; there are others at Liverpool, Godalming, and Croydon.

Epilobium, family Onagraceae, genus of 160 species of herbs of temperate and cold regions; commonly called willow-herb in Britain, fireweed in Canada. *E. hirsutum* is 'Coddins and Cream.' The Rose-bay willow-herb is now *Chamaenerion angustifolium*.

Epilogue (Gk *epilogos*, peroration of a speech) is now generally applied to a piece appended to the conclusion of a literary work, more particularly of a drama. As a literary form it has mostly been employed by Eng. writers; indeed, Ben Jonson made it a particular feature of his dramas, using it either to apologise for the defects of his play or to assert its merits. Later on the E. became very fashionable, and dealt with other subjects besides the preceding play, e.g. with politics, criticism, etc., and at the time of the Restoration hardly a play was produced on the Eng. stage which did not finish with one. Dryden even wrote a *Defence of the Epilogue*.

Epimedium, see BARRENWORT.

Epimenides (6th cent. BC), Cretan poet and prophet, b. at Phaestus. Though his story includes a wealth of legend, he is known to have visited Athens at the invitation of Solon (c. 596 BC) in order to purify the city after a pestilence said to have been due to the murder of Cylon (q.v.). E. is believed to be the 'prophet' alluded to by St Paul in *Titus* i. 12. See H. Deimoulin, *Epiménide de Crète*, 1901.

Epimetheus ('afterthought'), brother of Prometheus ('forethought'). Zeus, to punish mortals, gave him Pandora (q.v.), who brought disease and suffering upon mankind.

Epinal, Fr. fort. tn. cap. of the dept of Vosges, on the Moselle, at the foot of the Vosges Mts (q.v.). The church of St-Maurice is partly 13th cent., and there are a museum, a library, and a ruined château. It is the centre of a cotton-spinning dist., and makes cotton, embroidery, and machinery. It also prints coloured pictures of the saints—*images d'Epinal*. Pop. 24,000.

Epinay, Louise Florence Pétronille Tardieu des Clavelles d' (1726-83), Fr. writer, b. Valenciennes. She was acquainted with the Fr. men of letters of her day, including Voltaire, Diderot, Duclos, and Holbach, and was on an intimate footing with Rousseau (for whom she furnished a cottage in the valley of Montmorency) and afterwards with Grimm. Her pubs. include *Mes Moments Heureux*, 1752, *Lettres à mon Fils*, 1758, *Conversations d'Emilie*, 1774, which was crowned by the Fr. Academy; and *Mémoires et Correspondance*, her chief work, pub. in 1818.

Epiphanius, St (c. 315-402), a father of the Church, b. in Palestine of Jewish

parents, founded a monastery near Besanducan, his native vill., and in 367 was made bishop of Constantia (formerly Salamis), in Cyprus. Jerome called him 'Five-tongued,' for his linguistic powers, others deem him ignorant, but all find his *Panarion* (ed. Paris, 1622)—a hist. of 80 sects and heresies—the work of a bigot and his accusations ill-considered. He condemned the doctrines of Origen in a council of Cyprus, 402.

Epiphany. This word, in Greek, means an apparition of a divine being. The feast of the E. is held by the Rom. Catholic and Anglican Churches on 6 Jan. to commemorate the manifestation of Christ by 3 different events, the adoration of the Magi, the baptism of Christ, and the miracle of Cana. Many special observances were connected with the day, which under the name of Twelfth Night, in England, closed the Christmas festivities. Formerly the date of Easter for the year was on this day solemnly announced to the faithful. The sovereign of England still observes the day of the E. in the Chapel Royal by offerings of gold, frankincense, and myrrh at the altar. In both E. and W. the E. has always been a festival of the highest rank. It is older, in fact, than Christmas. In Italy gifts are given at E., in commemoration of the gifts of the Magi, rather than at Christmas.

Epiphyllum, family Cactaceae, a genus of 16 species, chiefly Mexican and S. American. *E. ackermannii*, and *E. oxypetalum* with night-opening, scented flowers, are popular indoor plants.

Epiphytes, plants which grow on others but do not absorb nourishment from them as is the case with parasitic plants. Common examples are lichens, mosses, and ferns on trees. In forests, especially in the tropics, E. form quite a feature of the vegetation, and many orchids, bromellia, arceas, gentians, and some cacti and rhododendrons are E. E. often have aerial roots which grow downwards, but never reach the ground, and which enable them to absorb nourishment and moisture from the air. *See also* PARASITE.

Epirus, div. of anc. Greece, corresponding to the S. of modern Albania, bounded by Illyria, Macedonia, and Thessaly, and stretching southward along the Ionian Sea to the Ambracian Gulf. The Greeks regarded the inhab. as semi-barbaric, but frequented the oracle of Dodona. The chief tns were Ambracia (a colony from Corinth) and Phoenice. For a little over 2 centuries from 450 BC E. was ruled by Molossian princes, the most famous of whom was Pyrrhus (q.v.). Aemilius Paulus ravaged 70 Epirote tns in 168 BC, in retaliation for their having assisted Persus of Macedonia in his bid for independence. Henceforward their hist. is a blank apart from their modern struggle for possession of N. E. At the Peace Conference in Paris (1846) Tsakdaris, prime minister of Greece, claimed that N. E., given to Albania after the First World War, must be restored to Greece. Before the First World War, the Greeks of N. E. had estab. more than 200 schools in that

prov. The pop. of the 5000 sq. km. of N. E. is about 200,000, of whom 60 per cent are Greeks; but a great many others had been forced to emigrate between the 2 world wars. The pop. of the rest of E. before the Second World War was 363,000.



Nancy Jenkins

CHILDREN OF EPIRUS

Episcopacy (from Lat. *episcopatus*, office of a bishop, Gk *episkopos*), the term applied to the system of Church organisation, where a bishop possesses the chief eccles. authority within a defined dist. or diocese. In this way it differs from both Presbyterianism and Congregationalism. The former has a gov. by presbyters, or elders, and in the latter each community of worshippers is autonomous. The bishop, in his own person, sums up the collective powers of the Church in his diocese, by divinely bestowed authority. Thus, both individually and collectively, the bishops are the essential ties of Catholic unity. Since the Reformation, the word is more especially connected with those churches which have an episcopal system but are not in communion with Rome. The Church of England is by far the most important of these, and, since the Reformation, has been the chief champion of simple E. against the Papal, Presbyterian, and Congregational systems. Anglican opinion is considerably divided as to the divine origin of E. The episcopal office in its essentials has practically disappeared from the Protestant communities of the Continent, though the Lutheran churches of Denmark, Norway, and Sweden still preserve it in something of its historical sense. In England the Reformation, being guided by the king's own hand, began on a conservative note; and although E. was abolished by law under the Commonwealth, the bishops were restored at the Restoration, and in the

thought of the time the monarchy was closely connected with them. In the Protestant Episcopal Church of the U.S.A., which is Anglican, the functions of the bishops are similar to those of Eng. prelates. The bishops of the Methodist Episcopal Church of America derive their orders from Thomas Colne, a presbyter of the Church of England, who was ordained by John Wesley in 1784 as 'superintendent' of the Methodist Society in America. See also APOSTOLIC SUCCESSION; and C. Jenkins and K. Mackenzie, *Episcopacy, ancient and modern*, 1939.

Episcopius, Simon (1583-1643), or Simon Bisshop, Dutch theologian, b. Amsterdam; gave form and system to the doctrines of Arminius and bravely endured a life of persecution rather than stifle his protest against the excessive dogmatism of the extreme Calvinists.

Episode, an incident in the life of an individual or people which is irrelevant to the broad march of events, that is, a deviation or, to use another metaphor, an excrescence. It is a Gk word (*episodes*) meaning 'after-entrance,' and, as Aristotle explains in his *Poetics*, was descriptive in the drama of all that happened between the choric songs. From the fact of their later origin, the scenes between the actors were, theoretically at least, subordinate to the performance of the chorus, and a rift in their continuity.

Epistaxis, bleeding from the nose. The causes may be local or general. A blow is the commonest local cause, while internal damage may occur from the introduction of a foreign body. Congestion of the already very vascular nasal mucous membrane, as in a cold, is a frequent cause of slight E. The blood vessels of the mucous membrane of the nasal septum are often varicose, and these may ulcerate from time to time causing brisk haemorrhage. Among general causes of E., hypertension in the elderly is the most usual. Repeated E. may also be a sign of a serious blood disorder, such as leukaemia, or of any condition in which the normal blood clotting mechanism is interfered with. E. is often salutary, and does no more harm than the mess it makes and the alarm it causes. As a first-aid measure it may be stopped by placing steady pressure on the affected side for about 15 minutes. Any clot formation should not be disturbed by blowing or sniffing.

Epistemology, that part of philosophy which treats of the possibility, nature, and limits of human knowledge. Among the predecessors of Plato (q.v.) it is possible to distinguish 3 main theories of knowledge, set forth by Plato himself. It appears that the sophists, following Heraclitus, taught that knowledge is no more than sense perception. Another view was that it was true belief, i.e. judgment founded on the impressions derived through sense. Finally the Cynic Antisthenes maintained that only compounds are knowable. Against the first of these theories Socrates affirmed that the truth of things is attained by general

notions reached through deduction and definition. Thus we consider a number of instances, e.g. 20 books, omit all that is peculiar to each, define what is common to each, and thereby arrive at a general notion of the essence, book. Plato accepted the Socratic view, rejected the other 2 current opinions, and constructed his theory of ideas which dominated the whole of W. thought for 2000 years, and still influences a large part of mankind. According to Plato it is necessary to distinguish between knowledge and belief, and to admit 2 classes of objects, the real and the phenomenal. The former he called ideas. They are permanent unchanging entities, existing in themselves and not as mere products of thought. These ideas in their totality make up intelligible reality. They are what we know, and all particular or phenomenal things, which are the objects of sense perception, somehow participate in them. They are the essence of particulars. These ideas are apprehended by the intellect (*nous*), a pure and unmixed act of the soul. Belief or opinion is the fruit of pure thought and perception combined. With Aristotle (q.v.) the ideas of Plato are not existing entities, but products of thought, universal concepts. The essences of particular things are in them according to reason as well as according to time. Aristotle taught that reality is an unbroken chain of being ranging from the purely indeterminate (first matter, *prôtê hulé*) to complete actuality (God). Every individual thing in nature is compounded of this matter and form (*morphê*) which gives to it qualities, its intelligible essence. He also discusses the various forms of cognitive activity, the process by which knowledge is acquired, and distinguishes sense perception, memory, experience, active and passive intellect. The scholastic philosophers, notably St Thomas Aquinas and Duns Scotus (qq.v.), accepted and developed the teaching of Aristotle. William of Ockham was the precursor of conceptualism according to which the only existent realities are individual things, universals being mere products of the mind. This led to nominalism (q.v.) which stated that universals are mere names since generalisation and indeed thought itself are impossible without words.

There are 3 prin. schools of modern E.: rationalist, empirical, and critical. Representative of the first school are Spinoza and Leibniz (qq.v.). Spinoza denies the existence of reality outside God, of whose eternal and infinite essence he says man has an adequate knowledge. Man is part of the world of phenomena, but can escape from its finiteness through 'salvation'. This theory is illogical inasmuch as it purports to reconcile reality and appearance while recognising the existence of the world of appearance. Leibniz does not regard the mind as a mere recipient of ideas. He takes into account the mind's reaction in knowledge, and thus opposes the view of Locke (q.v.), the first of the empirical school. Locke holds that all

our knowledge comes from sense experience and from that alone. Berkeley (q.v.) develops this view, asserting the non-existence of unthinking matter, a paradox which has had a considerable influence on E. and on philosophy in general. He postulates the falsity of all abstract ideas and argues that all possible ideas must be particular concrete facts of consciousness possessing characteristics or images which we can discover and describe. But he also allows that we have knowledge of other reality than that of our ideas, for we 'may be said to have some knowledge or *notion* of our own minds, of spirits and active beings, whereof, in a strict sense, we have no ideas.' This admission led him almost to go back on sensations, emphasising the intellectual apparatus of experience which enables us to rise to truth and to God. Hume (q.v.) further supplemented the empiricism of his predecessors in his analysis of knowledge which reduces every positive object of knowledge either to an impression or an idea. The former term comprises sensations and emotions, the latter the faint images of these livelier perceptions in thinking and reasoning. Kant (q.v.) stands at the head of the critical school. He taught that the intelligible world is explained by the unity of the self or of consciousness. This self is not merely an individual but is universal, and this consciousness has a rational validity and significance. We create the world, which is the product of our own understanding. Fichte (q.v.) goes further, regarding reality as wholly constructed by the ego. Since the death of Hegel (q.v.) modern E. has been represented by 2 schools. Spiritualists, theists, and idealists maintain that matter and spirit can be reconciled by rational insight. This is denied by positivists, agnostics, and Kantians. Modern epistemological research, however, is chiefly concerned with the nature of the act of cognition. The neo-scholastics accept in principle the doctrine of Aristotle as expounded by St Thomas Aquinas. Others, though differing at many points, appear to accept 4 common propositions: (1) Perception is a complex act involving more than the apprehension of sense qualities; (2) there is a distinction between the act of thinking and the thought; (3) thoughts or sense qualities are not identical with the physical object nor, necessarily, with any of that object's qualities; (4) what is known through sense perception is based on the apprehension of sense qualities and the perception of the relations between those sense qualities. See GREEK: D. Peipers, *Die Erkenntnistheorie Platos*, 1874; W. D. Ross, *Aristotle*, 1923; A. E. Taylor, *Plato*, 1926. SCHOLASTIC: A. Stöckl, *Geschichte der Philosophie des Mittelalters* (4 vols.), 1861-7; M. de Wulf, *Histoire de la philosophie médiévale*, 1905. MODERN: B. Russell, *A Critical Exposition of the Philosophy of Leibniz*, 1900; H. H. Joachim, *Study of the Ethics of Spinoza*, 1901; E. A. Prichard, *Kant's Theory of Knowledge*, 1901; J. Gibson, *Locke's Theory of Know-*

ledge, 1907; C. D. Broad, *Perception, Physics, and Reality*, 1914, and *Mind in Nature*, 1925; A. N. Whitehead, *An Enquiry concerning the Principles of Natural Knowledge*, 1919; R. Metz, *George Berkeley*, 1925.

Epistle and Epistolary Writing, see LETTERS.

Epistolae Obscurorum Virorum ('Letters of Unknown Men') appeared in 1516, and were followed the next year by a second part, the work of Ulrich von Hutten. In feeling they were intensely Protestant, and thus spurred on the Reformation. As they were full of vehement denunciations of monks and scholastics, it is natural that fear of persecution should have induced the author to conceal his name. He has been variously identified with Grotus Rubianus, Hutten, Erasmus, and Reuchlin.

Epistyle (Lat. *epistylum*), in architecture, the E. is the lowest div. of the entablature (q.v.), consisting of the main beam that rests immediately upon the abacus, i.e. the upper member of the cap. of a column, supporting the architrave.

Epitaph (Gk *epit*, upon; *taphos*, tomb), an inscription engraved upon a tombstone, or written ostensibly for that purpose. Anct (Gk E.s are of great literary interest: they form an important section of the Palatine Anthology, and derive their effectiveness from their simplicity. Typical is the famous couplet of Simonides on the Spartan dead at Thermopylae: 'Stranger, tell the Laedaemonians that we lie here obedient to their orders.' Rom. E.s were mostly short and prosaic by comparison. They commonly begin 'Siste, viator' (Stay, traveller), a natural invocation when burial places were usually by the road side, and ask for the wayfarer's prayers. An Eng. one on this classical model is that written by Coleridge for himself:

'Stop, Christian passer-by!—Stop, child of God,
And read with gentle breast. Beneath
this sod
A poet lies, or that which once seem'd
he.

O, lift one thought in prayer for S.T.C.' Another common classical phrase is 'Sit tibi terra levis' (Light be the earth upon thee). This sentiment is copied in the well-known E. by the Australian R. Richardson (1850-1901):

'Warm summer sun, shine friendly here;
Warm western wind, blow kindly here;
Green sod above, rest light, rest light—
Good-night, Annette! Sweetheart, good-night!'

Types of E.s show immense variety; they may be light-hearted, cynical, malicious, or frivolous and using all sorts of word-play. Self-written E.s vary from the dignified words of Keats, 'Here lies one whose name was writ in water' to the jocular resignation of these lines by A. Newland (1730-1807):

'Beneath this stone old Abraham lies;
Nobody laughs and nobody cries.
Where he is gone, and how he fares,
Nobody knows, and nobody cares.'

During the Victorian age long florid E.s containing a pompous catalogue of the deceased's supposed virtues were for a time the fashion, but in modern times the inscriptions are usually confined to name and date, with perhaps a single brief phrase. The Christian faith looks forward to eternal life, and Christian E.s most frequently conclude with the letters R.I.P. (Lat. *requiescat in pace*, may he [she] rest in peace). See S. Tissington, *Epitaphs*, 1857; H. J. Loaring, *Quaint, Curious, and Elegant Epitaphs*, 1872; J. R. Kippax, *Churchyard Literature*, 1876.

Epithalamium, or **Epithalamion** (Gk) was the song invoking all blessings and happiness which boys and girls of ancient Greece used to sing to the bride and bridegroom on their marriage. Sappho, Anacreon, and Pindar wrote epithalamia, which thus became an established form in literature. The finest of these nuptial hymns that have survived from the classics are Theocritus's 18th idyll, and Catullus's *Marriage of Thetis and Peleus*. Spenser's *Epithalamion* is one of the best examples in Eng. verse.

Epithelioma, see CANCER.

Epithelium, or **Epithelial Tissue** covers the surfaces and lines the internal cavities of the body. Its most important situations are: (1) On the surface of the skin; (2) on mucous membranes; (3) on the inner or free surface of serous membranes; (4) on the inner surface of the heart, blood vessels, and lymphatics. Every E. T. is formed entirely of cells united together with cohesive matter, and the mass thus formed closely invests the surface on which it is situated. It contains no blood-vessels, though plasma may diffuse through the minute channels sometimes existing between the cells. Nervous fibrils are usually abundant. The component cells vary in structure and shape, hence the most convenient classification of E. cells is according to shape and arrangement, viz.: (1) Simple epithelia, subdivided into (a) pavement or scaly, as in such a serous membrane as the peritoneum; (b) columnar, e.g. lining the mucous membrane of intestines. 'Chalice or goblet' cells are columnar cells distended with mucus; (c) spheroidal or glandular, e.g. in the liver; (d) ciliated, i.e. bearing spontaneously-moving filaments on their basal ends, as in nasal membrane. (2) Stratified E. of various types having cells in layers, the deeper usually columnar and the superficial ones flattened as in the E. of the front of the cornea. (3) Transitional E. of sev. types, but intermediate in character between (1) and (2), e.g. lining the ureters.

Epoch (Gk *epoché*, a pause) has a special astronomical meaning. It is impossible to determine the position of a planet or other body in its orbit unless its place at a given point of time is known. This given moment is called the 'epoch.'

Epode, an essential part of the chorus in Gk drama. It followed the strophe and antistrophe (qq.v.), being sung when the choir had returned to its original place. The term was also applied to a form of

lyric invented by Archilochus and finely handled by Stesichorus. Horace imitated Archilochus's metre in his 5th book of lyrics, which he accordingly named *Epodes*. In these, iambic trimeters and dimeters alternate.

Eponym (Gk *onoma*, a name), the mythical individual who has given his name to a people sprung from his descendants. Legend says that Pelops begat the Peloponnesians; Dorus, the Dorians; and Italus, the Italians.

Epping, par. and tn of Essex, England, situated to the N. of E. Forest, about 16 m. NNE. of London. It has an elevation of 380 ft above sea level. The forest was once part of the ancient forest of Waltham, and originally covered the whole of Essex co. What remains of it now is preserved by the city of London, and forms one of the largest and most frequented pleasure grounds of the country. It was for many years the constituency of Sir Winston Churchill, (q.v.). Pop. 6968. See W. Addison, *Epping Forest: Its Literary and Historical Associations*, 1948.

Epsom (a corruption of Ebbisham, the local manor), mkt tn, 14½ m. SSW. of London, in Surrey, England. The Royal Medical College on the Downs was founded in 1851 as a school for doctors' sons. There are sculptures by Flaxman and Chantrey in the Gothic church (rebuilt in 1824). In 1618 the springs containing sulphate of magnesia were discovered, and it seemed likely that E. would become a fashionable inland spa. To-day, however, the waters are forgotten, and E. is famous because the Derby (q.v.) and Oaks are run on the race-course on the Downs near Tattenham Corner. E. urb. dist. was enlarged in 1933 by the addition of the pars. of Ewell and Cuddington. It was incorporated in 1937. Pop. 68,055 (1954).

Epsom Salts were called because they were first manuf. by evaporating the water of the mineral springs at E. But they occur also in sea water, in the mineral springs of Pullna and Seidlitz, etc., in the Stassfurt mines (as reichardite), and in America are procurable from limestone beds. The chemical formula is $MgSO_4 \cdot 7H_2O$, and they are therefore described as hepta-hydrated magnesium sulphate. Their needle-like crystals belong to the orthorhombic system. In medicine E. S. are commonly used as a purgative: the intensely bitter taste can be disguised.

Epsomite, or **Sulphate of Magnesia**, used as a fertiliser, also in dyeing cotton goods.

Epstein, Sir Jacob (1880-), Russo-Polish sculptor, b. New York, educ. at the School of Art Students' League, New York. Later he completed his training at the Ecole des Beaux Arts, Paris. He migrated in 1904, and has become the most criticised sculptor of the present day. One of his first works in England, the series of figures on the frieze of the Brit. Medical Association's building, now Rhodesia House, in the Strand, London (1908), provoked controversy which became acute later with his W. H. Hudson memorial 'Rima' in Hyde Park (1925).

His Oscar Wilde memorial in the cemetery of Père Lachaise in Paris (1911), and his figures of 'Night' and 'Day' on the London Transport premises in Broadway, Westminster (1928-9) are other much-discussed works. Other famous works are his 'Two Doves' and 'Marble Venus,' executed in 1913 and 1914 respectively. The cry of 'Immoral' has been raised, notably over the Strand figures and the Wilde memorial which is the figure of a nude man whose sphinx-like face twists in a smile of mingled despair and tragic bitterness. In some beholders it evokes horror and resentment, in others wonder at the strength of realistic suggestion. Probably his loftiest contribution to art is the noble and dignified 'The Visitation' in the Tate Gallery (1926). There is a dual character in E.'s art, his carvings are distinct from his modelled portraits in which there is a trace of Rodin's spirit. The portraits, including the splendid 'Joseph Conrad,' 1924, form an impressive record of men and women of the age. One of his most recent bronzes is the 'Madonna and Child,' in which there is revealed 'a great emotional and formal suavity' in the movement of the arms of the 2 figures, while the general impression of the faces and figures visualised in the group is that of 'intense vexation of soul coupled with a spiritual recognition of the obstacles to be encountered in reaching happiness.' E. has also produced a number of drawings, the most characteristic of which are the neurotic 'The Sisters,' and the 'Mother and Son' series. His 'Genesis,' 1931, is a bold conception which produced the usual storm of criticism as well as imitations by other sculptors. In retrospect now, it is difficult to understand the outcry which his early work caused. The novelty has worn off and the world has learnt to expect the sudden dynamic assault of his powerful personality. Yet the controversy was not merely one between the Philistines and the enlightened; for Roger Fry denied that E. was a master of sculpture, and both Paul Nash and Eric Gill criticised him adversely; but among his influential champions were G. B. Shaw, Stokert (who resigned from the Academy because the president would not sign a petition against the removal of E.'s figures on the former Brit. Medical Association's building), Ricketts, Modigliani, and Matthew Smith. There is a sense in which it seems that E.'s vision has its origin in all that is greatest in the Jewish character. His 'Genesis' is a striking apocalyptic comment on our times, in which mankind is brought forth as a monster, swollen with a lust for destruction, and his 'Adam,' 1939, has the same quality—man stealing himself to resist a universe which threatens his existence. The 'Lucifer' of 1945, 'Lazarus,' 1949 (New College, Oxford), the 'Madonna and Child' for the Convent of the Holy Child Jesus, London, 1951, and 'Christ for Wladimir Cathedral, 1957, show no lessening of power. The artist was knighted in 1954. His autobiography,

Let There be Sculpture, appeared in 1940. See studies by B. van Dieren, 1920, and H. Wellington, 1925; L. B. Powell, *Life of Epstein*, 1932.

Epworth, vil. and par., and the bp. of John Wesley (b. 1703), 10 m. NNW. of Gainsborough in Lincs, England. Pop. 2000.

Equal-Area Projection, see MAPS.

'Equality State', see WYOMING.

Equation, a statement in mathematical form of equality between known and unknown numbers which is true only for certain values of the unknown but not for all. To solve an E. means to find the value or values of the unknown number which satisfy the E., e.g. $x + 4 = 7$ is true when x is 3. An E. that is true for all values of the unknown is called an *identity*, e.g., $x + x = 2x$. Simple E.s are of the type $2x + 1 = 100 - 7x$, and the general method of solution of a simple E. is to transpose all the terms containing the unknown x on to the left-hand side and the numerical quantities on to the right-hand side. This may be done by using the property of an E. that if any term is taken from one side to the other its sign must be changed. All the x 's, then, are added together, and the right-hand divided by the coefficient of the x , whence the value of x , 11 in the above E., is obtained. It is important to remember that the symbol x stands for a *numerical quantity*. When an E. contains 2 or more unknowns, e.g. $2x + 3y + 4z = 6$, it is called *indeterminate*. To get a definite solution of this E. 2 other relations between x , y , z must be given. The number of E.s required to get a definite solution of any E. containing 2 or more unknowns is the same as the number of unknowns. Such a group of E.s is called *simultaneous E.s*. All the E.s cited above are called E.s of the *first degree*. The *degree* of an E. is determined from the highest power of the unknown occurring in the E. Thus $3x^3 - 2x - 21 = 0$ is one of the 2nd degree, or a quadratic, the roots of which are 3 and $-2\frac{1}{2}$. $x^3 - 3x^2 - x + 3 = 0$ is one of the 3rd degree, or a cubic, the roots of which are 1, 3, and -1 , and so on. A quadratic E. (q.v.), has 2 solutions or roots, which are either both *real* or both *imaginary*, e.g. the E. $x^2 - 5x + 4 = 0$ has roots $x = 1$ or 4 (*real*), and the E. $x^2 + 1 = 0$ has roots $\pm\sqrt{-1}$ (*imaginary*). In general an E. of the n th degree has n roots, but some of these may be imaginary, and some may be equal. Imaginary roots always occur in pairs. The solution of E.s of higher degree than the quadratic E.s opens up the large subject of the *Theory of Equations*. This subject embraces all questions connected with the solution of every type of E. The cubic was first solved in 1505 by Scipio Ferro, although the general method of solution is known as Cardan's method. This solution is, however, not due to Cardan, but was obtained by him from Tartaglia. The solution of the biquadratic, that is, an E. of the 4th degree, was first obtained by Ferrari, who was a pupil of Cardan. Abel has shown, to the satisfaction of

mathematicians, that it is impossible to obtain a general solution of E.s higher than those of the 4th degree. An example of a biquadratic is $2x^4 + x^3 + x^2 + x - 1 = 0$, the roots of which are $-1, \frac{1}{2}, \pm\sqrt{-1}$. Notice that the imaginary roots $\pm\sqrt{-1}$ and $-\sqrt{-1}$ occur in pairs, as intimated above. It may be pointed out that by means of the relations between the solutions or roots of the E. and the coefficients of the terms of the E., E.s of a higher order may be obtained provided some other relations are also known, e.g. a relation between the roots themselves. But this obviously is a particular type of E., and is not embraced by Abel's demonstration. Approximate values of the roots of E.s in which the coefficients are numerical may be found by employing *Horner's method of approximation* to any degree of accuracy. See W. S. Burnside and A. Panton, *Theory of Equations*, 1881; H. W. Turnbull, *The Theory of Equations*, 1939.

Differential equations (q.v.), are of a special type involving differential coefficients. They have proved to be an invaluable tool in mathematics as applied to engineering, electricity and radio, and in the development of Relativity (q.v.), and Quantum Theory (q.v.); N. Miller, *Differential Equations*, 1935.

A *Binomial equation* is an algebraical E. consisting of only 2 terms. Its most general form is $a_1x^p \pm a_2x^q = 0$. This may be reduced to the form $x^r \pm a = 0$, where $p - q = r$ and $\frac{a_1}{a_2} = a$. The solution of this would be $x = \sqrt[r]{\pm a}$, showing that $x^r + a = 0$ has imaginary roots and $x^r - a$ has real roots.

Equation to a curve.—A curve may be viewed as the path traced out by a point moving under a given condition. See GRAPHICAL METHODS; QUADRATIC EQUATIONS.

Equation, Chemical. A C. E. represents both qualitatively and quantitatively the substances which react together and those which are produced. Every reaction must obey the law of the conservation of mass; and, therefore, the masses of each element shown on the left-hand side of the E. must be equal to those shown on the right-hand side. The E. $\text{CaCO}_3 + 2\text{HCl} = \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$, expresses the fact that 100 grams of calcium carbonate (CaCO_3) react with 73 grams of hydrochloric acid (HCl), producing 111 grams of calcium chloride (CaCl_2), 44 grams of carbon dioxide (CO_2) and 18 grams of water (H_2O) (atomic weights $\text{Ca} = 40, \text{C} = 12, \text{O} = 16, \text{H} = 1, \text{Cl} = 35.5$). The E. further shows the relative vols. of the reacting gases and of the products. Since a gram molecule of any gas (e.g. $\text{HCl} = 1 + 35.5 = 36.5$ grams) occupies 22.4 litres under standard conditions of temp. and pressure, the E. shows that 44.8 litres of hydrogen chloride gas would produce, from sufficient calcium carbonate, 22.4 litres of carbon dioxide. In these respects a C. E. is very useful, but it has certain defects.

As ordinarily written it does not show the physical states of the substances, whether solids, liquids, or gases; it does not deal adequately with the many cases of balanced action, nor show the thermal changes which accompany reactions, though many of these points can be indicated by the use of additional symbols or figures.

Equation of Energy. The general form of this E. can be expressed as follows: $T - T_0 + V - V_0 = W$, where T_0 and V_0 denote the kinetic and potential energies in the initial position of a system acted on by external or internal forces, and subject to any constraints or mutual connexions, and T and V denote those in the position at the instant under consideration. W denotes the work done by the external forces and also by the internal stresses arising from the action of the particles in the body. On this E. is based the important theory of the action of forces on a connected system.

Equation of Time, see DAY.

Equator (from Late Lat. *aequator*, from *aequare*, to equalise), imaginary great circle drawn on the earth's surface in a plane at right angles to its axis, and equidistant from either pole. It is the dividing line between the N. and S. hemispheres. This E. is often called 'terrestrial' or 'geographical' to distinguish it from the 'celestial equator'. See EQUINOCTIAL.

When a ship crosses the E. or the 'line' it is customary for the crew to stage a mock ceremony on deck. Those who are making the passage for the first time, after making obeisance to King Neptune and his court, are lathered, shaved, and tossed into a bath of water; after which they receive 'Davy Jones's Certificate' in the form of a passport upon the high seas and conferring the 'Freedom of the Raging Main.' This now good-natured horse-play was once accompanied by much brutality.

Equator, Magnetic, line joining all places on the earth's surface for which the dip (q.v.) is zero. It follows an irregular course in the neighbourhood of the geographical E.

Equatorial Current, see ATLANTIC OCEAN.

Equerry, see HOUSEHOLD, ROYAL, ad fn.

Equidae. The horse family; in zoology a family of odd-toed (perissodactyl) hoofed animals. Middle digit and hoof enlarged, and alone support the body; lateral more or less reduced in size and functionless. The 1st and 5th digits and corresponding metapodials, in living genera, are wanting; also the 2nd and 4th, but the metapodials are present, though they are mere splint bones. The shaft of the ulna is atrophied; its extremity being consolidated with the radius; fibula rudimentary and ankylosed with the tibia. The skull is very elongated; the cranial cavity is small, and the bones of the face are well developed.

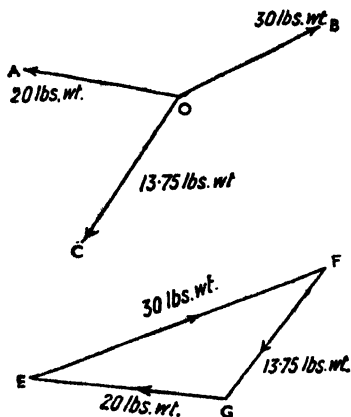
Equidistant Projection, see MAPS.

Equilibrium, in mechanics, is the state of rest of a body under the action of 2 or more forces. The E. may be *neutral, stable, or unstable*.

Neutral equilibrium.—If a body or a

material system is balanced by the forces which act upon it in any position in which it may be placed, its E. is *neutral*. This is the case with a sphere or a circular cylinder of uniform material with its curved surface placed on a horizontal plane. Any body whose centre of gravity is at the fixed point of support, or is always at the same height above the point of support, is in neutral E.

Stable equilibrium.—If a body, displaced a small distance from its E. position, oscillates about that position its E. is said to be *stable*. This is the case with a pendulum, or with a sphere loaded in its lowest part.



Unstable equilibrium.—If, on the other hand, the system can be displaced in any way from a position of E., so that when left to itself it will not vibrate within very small limits about the position of E., but will move farther and farther away from it, the E. is said to be *unstable*. Thus an egg or a billiard cue standing on end presents a case of unstable E. In many cases the E. varies with the direction of displacement. If it is unstable for any one displacement, the body as a whole is said to be unstable. Thus a coin standing on its edge is in neutral E. for displacements in its plane, but is in unstable E. for those perpendicular to its plane or even at small angles to its plane. It is, therefore, practically in unstable E.

The conditions required for E. vary according to the number of forces and according as to whether the forces are acting in the same plane or not. Thus 2 co-planar forces can only balance when they are equal in magnitude and directly opposed to each other. 3 co-planar forces acting at a point will be in E. if they can be represented in magnitude and direction by the 3 sides of a triangle taken in order.

In the figure the forces of 20 lb. weight, 30 lb. weight, and 13.75 lb. weight will

balance, for they can be represented by the sides of the triangle EFG, EF, FG, and GE being in the ratio 30 : 13.75 : 20. Any number of co-planar forces acting at a point will be in E. if they can be represented in magnitude and direction by the sides of a closed polygon taken in order. If the forces lie in one plane, but do not meet in a point, the conditions for E. are: (1) The sums of all the resolved parts of all the forces in any 2 directions, oblique or at right angles, must be separately zero; (2) the sum of the moments of all the forces (or of their components) about any point must be zero. The condition (1) must be satisfied if there is to be no trans.; and the condition (2) must be satisfied if there is to be no rotation. If the forces do not act in one plane, we may make use of the Principle of Virtual Work. (See VIRTUAL DISPLACEMENT and VIRTUAL WORK.) If the points of application of the forces receive any very small displacements consistent with the mechanical connections, the total work done will be zero, when the forces are in E.

Equimultiples (from Lat. *aequus*, equal, and *multiplex*, manifold), products obtained by multiplying quantities by the same quantity. Thus 15 and 85 are E. of 3 and 17, and a^2bc and bc^2a of a^2c and c .

Equinoctial, another name for the 'celestial equator,' which is the imaginary great circle traced by the points of intersection of the plane of the terrestrial equator and the celestial sphere. The 'equinoctial points' are the points of intersection of the ecliptic and terrestrial equator. This intersection indicating that the sun is exactly on the equator. Astronomers therefore choose one of these points as a convenient point from which to reckon the co-ordinates of the heavenly bodies, and the vernal equinox has been selected for this purpose. See EQUINOXES.

Equinoctial Gales, popular superstition to which science lends no support. Storms are not more prevalent at the equinoxes than at other seasons.

Equinoxes (from Lat. *aequus*, equal, and *nox*, night) are the 2 days in the year, about 21 Mar. and 22 Sept., when the days are equal to the nights all over the world. Owing to the inclination of the earth's axis of rotation to the ecliptic, as it journeys round the sun, the portion of its surface which is lightened by the sun's rays, the circle of illumination, varies; but at the E. the sun apparently describes the equatorial circle, and exactly half of each hemisphere at any instant is illuminated. At the vernal E. (in Mar.) the sun passes from S. to N., which results in the days lengthening in the N. hemisphere, and from N. to S. in the autumnal, when the days shorten.

Equisetales, or 'horse-tails', a group of large bamboo-like trees which were common in Coal Measure times. They bore whorls of leaves at regular intervals on the stem, as in the typical genus *Calamites*. The leaves are called *Annularia*, *Asterophyllites*, etc., and the sporangia *Calamostachys*, etc. The plants probably lived in waterlogged soil. See also Equisetum.

Equisetum, genus of plants, popularly known as horsetails, of the family Equisetaceae. Of the 20 species of the genus, about half are Brit. In general habit they all bear a strong family likeness to each other, all having stiff, upright, jointed stems, with whorls of little-developed leaves, those of each whorl being united to form a sheath around the stem. They have a creeping, much-branched rootstock which penetrates the ground to a great depth. The fructification is in the form of cones, each of which is borne at the end of an upright stem or branch. The commonest wild species is *E. arvense*. The rough stems of some species, rich in silica, are sometimes used for polishing woods or metals. See also Equisetales.

Equitable Charge. An E. C. or mortgage arises either: (1) from the mortgage of an E. as distinct from a legal interest, e.g. where a *cestui que* trust (i.e. beneficiary of an estate in real or personal property held by trustees) charges his property as security for a loan; or (2) by reason of the form of mortgage being recognised by equity and not at common law. A common law mortgage implies the conveyance by deed of the mortgagor's legal interest to the mortgagee; equity allows the creation of an E. C. (a) by mere deposit of title deeds, or (b) by an unsealed written agreement to deposit without actual deposit of deeds. Generally speaking, the incidents in both legal mortgages and E. C.s are the same, but where property has been mortgaged by deed, whether before or after the creation of an E. C. on the same property, the legal has priority over the E. mortgagee.

Equitable Estates, see ESTATE.

Equites (from Lat. *equus*, horse), horse-men or knights of anc. Rome. At first they formed part of the army. Servius Tullius increased the number of 'centuriae' (hundreds), into which they were divided, from 6 to 18. The first 6 were purely patrician; the latter 12, plebeian. But beside the 'equites equo publico,' who received money for their mount from the state treasury, there were 'equites equo privato,' volunteers providing their own horse. After the second Punic war the knights exerted a political influence second only in importance to that of the senate. They farmed the prov. taxes and constituted the capitalist class. The democrat, Gaius Gracchus (q.v.), used them as a foil to the aristocracy, a policy imitated without intermission up to imperial times, and guaranteed their support by granting them control of the jury courts, as well as the revenues of Asia. Under Augustus many civil posts of honour, such as the prefecture of the corn supply, were open to them after military service. Once more, however, they became primarily soldiers instead of financiers.

Equity. In England E. popularly means natural justice or fair play. Lawyers use the term in a more technical sense as that system of law which has been evolved in the chancery court to provide

relief for wrongs for which the common law offered no remedy. The lord chancellor's court was regarded as a 'court of conscience' which would dispense justice to suitors denied it by the common law courts because of rigid procedural difficulties. These equitable remedies were at first entirely discretionary and, indeed, haphazard, hence the significance of Selden's aphorism that 'equity varies with the length of the chancellor's foot.' By the 18th cent., however, E. had crystallised into a clearly defined system of rules based on judicial precedents. Until the passing of the Judicature Act, 1873, there were 2 systems of law, common law and E., which were respectively administered by the common law courts and the court of chancery. That Act set up the Supreme Court of Judicature which administered both systems. For administrative convenience, however, E. matters are assigned to the Chancery Division of the High Court. (See CHANCERY, COURT OF.)

The administration of E. has been built on a number of maxims which guide the courts in reaching their decisions. These maxims include: (1) E. follows the law (i.e. E. will not interfere with the common law (see LAW) unless there is some important circumstance which it has disregarded); (2) E. will not suffer a wrong to be without a remedy by reason of a mere technical defect; (3) he who seeks E. must do E.; (4) he who seeks E. must come with clean hands; (5) E. looks to the intention rather than the form; (6) E. acts *in personam*; i.e. equitable rights were originally enforced by decrees (q.v.) against persons who could be attached for contempt (q.v.), for disobedience; in modern chancery practice, the court makes orders affecting property (i.e. 'in rem'), e.g. foreclosure orders (q.v.); (7) E. imputes an intention to fulfil an obligation, e.g. it will enforce a covenant; (8) E. looks on that as done which ought to be done (to use a homely phrase, it will see fair play); (9) equality is E. (see COMMON, TENANTS IN); (10) where there are equal E.s (equitable rights), the first in time shall prevail, e.g. a purchaser for value of a house which, unknown to him, is subject to a mortgage, nevertheless, takes it subject to the mortgagee's interest; (11) where there are equal E.s the law shall prevail, e.g. A mortgages his land to B by depositing the title deeds (i.e. equitable mortgage), then later, without disclosing that fact, executes a legal mortgage in favour of C. On the sale of the property, the repayment of C's loan out of the proceeds will have priority, although made subsequently, as he has not only as good an E. as B but also the legal estate; (12) delay defeats E. (see LACHES).

In its widest sense, E. may be described as the ethical notion of fair treatment. In the administration of law, it is effectuated by the principles of judicial impartiality and uniform and consistent interpretation of legislation and case law within the limits of human fallibility

See H. G. Hambury, *Modern Equity*, 6th ed. 1952; G. W. Keeton, *An Introduction to Equity*, 3rd ed. 1952; E. H. T. Snell, *Principles of Equity*, 24th ed. 1954.

Equity, Bill in. see BILL.

Equivalent (of an element), see COMBINING WEIGHT.

Equivalent Circuit, in electrical engineering, a diagram of an electric C. consisting of combinations of resistance, inductance, and capacitance (*RLC*) representing apparatus such as a machine or a transformer as far as its behaviour in a network under different load conditions is concerned.

Equivalents, Chemical. see COMBINING WEIGHT.

Equuleus, constellation, near Aquarius, in the N. hemisphere. The name means 'colt,' and Ptolemy called it 'hippopotamus.' It contains a remarkable double star (δ Equulei) which has the shortest period of revolution, 5.7 years, of any known visual binary. *Equuleus Pictoris* (Painter's Easel) is near Canopus in the S. hemisphere, and is usually called Pictor. Er Rif, see RIF.

Era. see CHRONOLOGY.

Eran. see IRAN.

Eranthis, genus of tuberous perennials, family Ranunculaceae, 7 species; see ACONITE.

Erard, Sébastien (1752-1831), Fr. maker of musical instruments, constructed his first piano in Paris in 1780. During the Revolution he was in London, and again from 1808-12. He invented the harp with double pedals and the grand piano with double escapement. His instruments won high commendation from the foremost musicians of the day. He was succeeded by his nephew Pierre (1796-1855).

Erastriatus (c. 310-250 BC), famous physician and physiologist, b. at Iulis in the is. of Chios. He was the son of Cleombrotus and Cretoxene, and became a pupil of Chrysippus. About 294 BC he was physician at the court of Nicator, king of Syria, but he later settled in Samos and founded a school of medicine. E. discovered the difference between sensory and motor nerves, and believed the heart to be the origin of veins and arteries. He is called the father of physiology. His works only remain in fragments. See Hieronymus, *Erastriatus et Erastriatorum Historia*, 1790; and Fuohs, 'De Erastriato Capita Selecta' in *Hermes*, vol. xxix, 1897.

Erasmus, Desiderius (1466-1536), Dutch scholar and theologian, the illegitimate son of Gerard de Praet of Gouda. He styled himself 'Roterodamus,' a native of Rotterdam, though a contemporary document states that he was b. in his father's native tn. He was educ. at St Lebuin's church, Deventer (1475-84), and was a chorister at Utrecht. On the death of his father in 1484, he went to a seminary at 's-Hertogenbosch, and later joined a religious order in the house of St Gregory's at Steyn, being ordained priest in 1492. Shortly before this he had become secretary to Henry, bishop of Cambrai, and in 1485 entered the college of Montaigu, in

the univ. of Paris, where he won great fame as a scholar. He eked out his living by taking pupils, one of whom, Wm Blount, Lord Mountjoy, persuaded him to visit England in 1498. At Oxford he discussed theology with John Colet and began his friendship with Grocyne, Linacre, Thomas More, and others, but returned to Paris in 1500. In this year he brought out his *Collectanea Adagiorum*, which contained extracts from the Classics and from the Fathers. E. travelled about the Continent considerably, teaching privately and studying wherever he went. In 1506 he went to Italy as the tutor of the 2 sons of Baptista Boerio, Henry VII's physician. There



DESIDERIUS ERASMUS

Engraving after a painting by G. Penn

he made new friendships with such men as Aldus Manutius, the Venetian printer, who pub. for him a new and enlarged ed. of his *Adagia*, entitled *Chiliades Adagiorum*. In 1509 he again came to London and stayed with his friend More. At this time he wrote his brilliant satire called *Encomium Morie*, in which kings, popes, bishops, and the like, all came under his lash. He now visited Cambridge, where he finished his work on the Gk N.T., and on Seneca and St Jerome, and where he taught Gk and lectured on divinity. E. had now a large circle of disciples, both on the Continent and in England. In 1511 he pub. *De Duplici Copia Verborum et Rerum*, a text-book of rhetoric, and his N.T. appeared in 1516. From 1516 to 1521 he lived chiefly at Louvain, near the court, though he often journeyed to Brussels or to Basel and in 1517 went for the last time to England. At Louvain he prepared his ed. of the *Christian Fathers*. About this time he formed a friendship with Johann Froben, a publisher of Basel,

and in 1521 E. settled permanently in that town to become Froben's general literary adviser. Between 1516 and 1536 Froben's press issued a remarkable series of the Fathers, including Jerome (1516), Hilarius (1523), Ambrose (1527), Augustine (1528), and Origen (1536), which was largely the work of E., though he had many coadjutors. Froben d. in 1527, and 2 years later E. moved to Freiburg to avoid the religious dissensions that were disturbing Basel, but he returned to the latter town in 1535, where he d. of dysentery in the following year. E. never left the Catholic Church. The Lutherans he ridiculed in his *Diatriba de Libro Arbitrio*, 1526, and Ulrich von Hutten in his *Spongia*, 1523; but the papists suffered equally in his *Colloquia*, pub. between 1516 and 1536. He was accused of indifference and of wavering, but it was only natural that such a hard and sure critic should make enemies. E. was a great scholar and humanist, and in no sense a religious reformer. He was fully conscious that many abuses existed in the Church; but he was also more alive than many of his contemporaries to the theological dangers which were the logical conclusion of many of the reformers' policies. There are numerous Eng. trans. of his colloquies and other writings. Complete eds. have been pub. by the Froben Press, Basel, 1540, and J. Le Clerc (ed.), Leyden, 1703-8; F. M. Nichols (ed.), *The Epistles of Erasmus from his Earliest Letters to his Fifty-First Year*, 1901-18; and P. S. and H. M. Allen (ed.), *Opus Epistolarum Des. Erasmi Rotterodami*, 1906-34. See lives and studies by J. Jorten, 1758-60; R. B. Drummond, 1873; J. A. Froude, 1894; P. S. Allen (*The Ages of Erasmus*), 1914; R. H. Murray (*Erasmus and Luther*), 1920; J. Huizinga, (*Erasmus*), 1924; J. A. K. Thomson (*Erasmus in England*), 1930-1.

Erastus, Thomas (1524-83), Swiss theologian, surnamed Liebler, Lieber, or Lüder, b. at Baden, Switzerland, of a poor family. He studied theology at Basel (1540), and later philosophy and medicine at Padua. In 1558 he became prof. of Medicine at Heidelberg and private physician to the Elector Palatine, Otto Heinrich. He was elected privy councillor and a member of the Church Consistory (1559), and prof. of ethics at Basel in the last year of his life. E. was chiefly renowned as a theologian. At the conferences of Heidelberg (1560) and Maulbronn (1564) he upheld the Zwinglian doctrine of the Sacrament of the Lord's Supper as a merely symbolical ordinance, and, through the influence of the Calvinists, he was excommunicated on a charge of Socinianism. His most important work, written 1568, pub. posthumously 1589, was entitled *Explicatio gravissimae quaestionis utrum excommunicatio, quatenus religionem intelligent et amplectentes, a sacramentorum usu, propter admissum facinus arceat, mandato nitatur divino, an excoitata sit ab hominibus*, and upheld the right of the state to punish eccles. offenders. Hence, 'Erastianism' denotes the doctrine of the supremacy of the state in eccles. matters,

though this was supported by Grotius rather than by E. He denied the right of the Church to inflict civil penalties, or to exercise discipline, that appertaining, he maintained, to the province of the civil magistrate. E. also pub. treatises on the theories of Paracelsus, astrology, alchemy, medicine, etc.

Erasure, or **Rasure** (Lat. *radere*, to scrape or shave), the alteration or interlineation of a deed, will, or other formal writing. According to Eng. law, an E. is presumed to have been made at or before execution in the case of a deed or other document. In the case of a will, however, the writing stands without the alteration, unless the witnesses have initialled such alteration and have made a note of it at the end of the will. An alteration made in a deed by a stranger without consent of the parties does not prevent its contents from having effect; if altered by a defendant it may be given in evidence by him, but if by a plaintiff he cannot enforce any benefit that may thereby accrue to himself. In Scotland, the law presumes that the E. was made after execution. If it is desired to make any alteration, addition, or deletion in a deed, such E. must be 'noticed in the body of writ' and must be 'subscribed by the attesting witnesses.'

Erato, Gk goddess of erotic poetry and music. See MUSES.

Eratosthenes (c. 276-c. 194 BC), Gk mathematician and scientific writer, b. at Cyrene. He was a pupil of Callimachus at Alexandria, and subsequently studied philosophy with Aristotle and Arceasius at Athens. About 235 BC he returned to Alexandria and succeeded Callimachus as chief librarian. His most famous work was a systematic treatise on geography, of which Strabo made great use. Strabo says that E.'s primary object in geography was to reform the *Map of the World*. E. invented a scientific chronology, fixing the conquest of Troy as the basis of his calculations. He also invented a 'sieve' by means of which prime numbers might be discovered. He measured the earth, and calculated that its circumference measured 252,000 stadia. His book on mathematics is lost, but fragments remain of his astronomical poems, *Hermes* and *Erigone*.

Erbium (symbol Er, atomic weight 168, atomic number 68), a metallic element of the rare earths (q.v.). The rare earth metals are present in the minerals gadolinite, samarskite, euxenite, fergusonite, and cerite. It forms rose-coloured salts and a rose-coloured oxide, the former of which possess a characteristic absorption spectrum.

Erceidounne, Thomas of (c. 1220-c. 1297), also known as Thomas the Rhyner or Thomas Learmont, Scottish poet and seer. From 2 charters of the 13th cent. it appears that he had lands at E., now Earlston, in Berwickshire. A great number of prophetic sayings were attributed to him, from which he got the name of True Thomas; he was said in 1286 to have predicted the death of Alexander III. A

semi-legendary figure like the Eng. Merlin, he was supposed to have been carried off to Elfland by the fairies but allowed to revisit the earth for a time. Sir Walter Scott believed him to be the author of the poem *Sir Tristram*, based on a Fr. original. See J. A. H. Murray (ed.), *The Romance and Prophecies of Thomas of Erceldoune*, 1875; and a study by A. Brandl, 1880.

Erceldoune, or **Ercildoune**, see **KARLSTON**.

Ercilla y Zúñiga, Alonso de (1533-94), Sp. soldier and poet, b. at Madrid. He was attached to the train of Phillip II, with whom he came to England in 1554. Soon afterwards he joined a small company who sailed for Chile to crush the revolted Araucanians. Having suffered imprisonment at the hands of his comrades, he was released, and returned to Spain in 1562. His fame rests on his epic poem, *La Araucana*, 1569-89, which has been highly praised by Cervantes and Voltaire. See J. T. Medina, *Vida de Ercilla*, 1948.

Erckmann-Chatrian, literary signature of 2 Fr. writers who collaborated in their work. Emile E. (1822-99) was b. at Phalsbourg. He practised law from 1842-1858. Louis Gratien Charles Alexandre C. (1826-90) was b. at Soldatenthal, in Lorraine. He was first a teacher and afterwards a clerk in a railway office. The partnership dates from 1847, and continued till 1889. Their best known novels, often describing life in Alsace, are: *Histoires et contes fantastiques*, 1849; *L'illustre Docteur Mathus*, 1859; *Madame Thérèse*, 1863; *Histoire d'un conserit de 1813*, 1864; *Waterloo*, 1865; *Le Bicus*, 1867; *Le Grandpère Leligue*, 1886. They also wrote dramas: *Le Juif polonais*, 1869; *L'ami Fritz*, 1876; *Les Rantzau*, 1882. See lives by J. Claretie, 1883; E. Hinzlin, 1922; L. Shoumacker, *Erckmann-Chatrian*, 1933.

Erckmann, Otho Linné (1804-69), Ger. chemist, b. Dresden; prof. of chem. at Leipzig Univ. from 1827. He devoted much time to the chemical analysis of indigo and other dyestuffs. His *Manual of Chemistry and Principles of Drugs* went through sev. eds. In 1827 he pub. an instructive treatise on nickel, and in 1861 a brochure on the study of chem., which was trans. into sev. languages. In collaboration with Wetherer he directed the *Ger. Journal of Practical Chemistry*.

Erebus, in Gk mythology, son of Chaos, and the father of Aether (upper air) and Hemera (day) by his sister Nyx (night). The word denotes utter darkness, and is used by poets with regard to the gloomy subterranean region through which the departed shades must pass on their way to Hades.

Erebus, Mount, volcano in Victoria Land, Antarctica, discovered by Capt. (afterwards Sir) James Ross in 1841, and named after one of the vessels in the expedition. The volcano is active, and is 15,900 ft in height. Much painted by Edward Wilson (q.v.).

Erechtheum, temple dedicated to the worship of Erechtheus (q.v.), on the Acropolis at Athens. The present remains,

which are of great beauty, date from about 400 BC.

Erechtheus, or **Erichthonius**: 1. An Athenian hero, the son of Hephaestus and Athlis, daughter of Cranaeus, secretly reared by Athena, who concealed him in a chest which she entrusted to Agrauios, Pandrosos, and Herse. They opened the chest, though forbidden to do so, and saw a large serpent twined round the child. Filled with fear they committed suicide by hurling themselves from the Acropolis. E. was said to have become king of Athens, and first introduced there the worship of Athena (q.v.), erecting her temple on the Acropolis. He arbitrated between Athena and Poseidon for the patronage of Attica, choosing the former. After death he was placed among the stars, and was worshipped in the Erechtheum on the Acropolis. See **ATHENA**.

2. The grandson of (1) and son of Pandion, whom he succeeded as king of Athens. He fought against Eleusis, and killed Eumolpus, Poseidon's son; whereupon Zeus slew him with a thunderbolt, at Poseidon's request. In ancient mythology these two were one person, but distinguished as two by later writers.

Erembodegem, tn in the prov. of E. Flanders, Belgium, on the R. Dender, S. of Alost. It manufs. lace and cotton. Pop. 10,100.

Eremurus, genus of herbaceous perennials, family Liliaceae, 30 species, of Persia and Turkestan, remarkable for their tall, stately, flowering spikes of white or yellow in summer.

Eretria (modern **Aletria**), ancient seaport of Euboea, Greece, on the Euripus, about 15 m. S.E. of Chalcis. It was of great commercial importance, and had numerous colonies. In 490 BC it was destroyed by the Persians before the battle of Marathon, for its interference in the Ionic revolt (498). During the 5th cent. BC it was subject to Athens, but regained its independence under Philip of Macedon through its leader Phocion (354). It was the bp. of Achaicus and Menedemus. At the modern vil., sometimes known as Nea Psara, the Amer. School of Athens carried out archeological investigations from 1890 to 1893.

Erfurt: 1. Dist. (*Besirk*) of the Ger. Democratic Rep. (E. Germany), bounded W. by the *Länder* of Hessen and Lower Saxony, N. by Halle, E. by Gera, and S. by Suhl (qq.v.). It was formerly part of Thuringia (q.v.). Area 1378 sq. m.; pop. 1,285,000.

2. Ger. city, cap. of the dist. of E., on the Gera, 145 m. SW. of Berlin. It became a bishopric in 741. In late medieval times it was an important textile manufacturing city and a member of the Hanseatic League (q.v.). During the Thirty Years War (q.v.) it was in the hands of the Swedes; in 1648 it was ceded to the Elector of Mainz, but, refusing to submit, had to be forcibly taken in 1664. It was incorporated with Prussia in 1802. In the 19th cent. its fortifications were demolished, and its limits extended greatly as it developed

into a busy industrial centre. During the Second World War, in April, 1945, following the trapping of the Ger. Army Group B. in the Ruhr, an easy advance was offered to the Allies from Kassel through E. and Leipzig to Dresden; and when this was accomplished, the Allies held the richest industrial area still remaining to the Germans after the loss of the Ruhr and Silesia. E. fell on 12 April. The city has a beautiful cathedral, *Reatae Mariae Virginis*, which dates from the 12th-15th cents., and sev. other fine Romanesque and Gothic churches. In the former monastery of St Augustine, Luther (q.v.) lived as a friar 1505-8. The univ. was suppressed in 1816. There are engineering, textile, and footwear manufs., and there is a trade in flowers, vegetables, and seeds. Pop. 190,000.

Erg, in dynamics, is the unit of energy or work, and is the work done by 1 dyne (q.v.), in moving its point of application through 1 cm. The power of machinery may be measured by the number of Es per sec. of which it is capable. The E. is also equal to the energy of 2 grams moving with a unit speed. See MECHANICS; METROLOGY.

Ergasteria, see LAURION.

Ergoti, see ARGYRO-KASTRO.

Ergosterol, a sterol, so named from its occurrence in ergot of rye. Also found in yeast. It is present in very small quantities as an impurity of cholesterol found in animal cells. When irradiated by sunlight, E. in superficial tissue cells yields up the anti-rachitic vitamin D, vital to health. E. in solution, irradiated by ultra-violet rays, is used to supply deficiencies in vitamin D. Sterols are a class of monohydroxylalcohols which are widely distributed in nature. Their solubilities are similar to fats.

Ergot, or **Spurred Rye**, a diseased condition or fermentation of R. and of other cereals. A sweet yellowish mucus exudes from the ears of the corn on its first appearance. The ears then lose their starch and the ovaries show a whitish tissue of the mycelium of the fungus. Bread that has been made of such infected R. often gives rise to certain nervous complaints, known as ergotism (or, in medieval times, St Anthony's Fire). A serious outbreak of ergotism occurred at the vil. of Pont St Esprit, France, in Aug. 1951. See MATERIA MEDICA.

Erie, name of sev. Dan. and Swedish kings, of whom the best-known is E. XIV (1533-77), king of Sweden (1561-8), son of Gustavus Vasa. Though a cruel and capricious ruler, his acquisition of Estonia marked the beginning of Sweden's overseas expansion. E. limited the power of the nobility in 1561, but after his murder of the Stures in 1567 the nobility rose against him and he was deposed in 1568, his brother John succeeding him. E. at various times considered marriage with Elizabeth I of England and Mary Queen of Scots; but he finally married his mistress, Katrina Månsdotter, a peasant, who alone seems to have been able to control him in his fits of insane temper. He is

believed to have d. from poisoning (1577), administered on his brother's orders.

Erie the Red, Norwegian chief who discovered Greenland in the 10th cent. and sent out expeditions to N. America.

Erioca, the typical genus of Ericaceae, containing over 500 evergreen shrubs, some trees, natives of Africa and Europe; up to 470 species of S. Africa. The plants have bell-shaped, 4-parted, hanging flowers, and linear leaves. Brit. species include *E. cinerea*, Bell-heather; *E. ciliaris*, Dorset Heath; *E. tetralix*, Cross-leaved Heath; and *E. vagans*, Cornish Heath. *E. mediterranea* is found in Ireland. The above and their varieties are grown in gardens together with the winter-flowering *E. carnea*, of S. Europe; *E. australis*, Sp. Heath; *E. arborea*, Tree Heath; and *E. scoparia*, the Besom Heath; succeeding best in well-drained, peaty soils. The Cape Heaths, *E. campanulata*, *E. canaliculata*, *E. gracilis*, and hybrids, are popular greenhouse plants.

Ericaceae, family of dicotyledonous shrubs or small trees, about 1500 species of cold, temperate, and alpine regions. Leaves usually alternate, flowers 4- or 5-parted. Plants have strong preferences for lime-free, acid soils. Genera include *Andromeda*, *Arbutus*, *Arctostaphylos*, *Caluna*, *Cassiope*, *Erica*, *Daboecia*, *Gaultheria*, *Gaylussacia*, *Kalmia*, *Pernettya*, *Pieris*, *Rhododendron*, *Vaccinium*, *Zenobia*, etc.

Erioca, see ERYX.

Erieht, Loch, lake (14 m. long and from 1 m. to 1 m. broad; greatest depth c. 512 ft), situated partly in Inverness-shire and partly in Perthshire, Scotland, in the dist. of Badenoch on the N., and Rannoch on the S. It lies 1153 ft above sea-level. The lake is drained by the R. Erieht into Loch Rannoch. The neighbouring scenery is wild and rugged; the overhanging mt on the W. side of the lake is Ben Alder (3757 ft). There is good salmon and trout fishing.

Eriocsson, John (1803-89), Swedish naval engineer, b. Langbanshyttan, Wermland, Sweden. He was first employed as a draughtsman by the Swedish Canal Company (1815), but entered the army in 1820 and served for 6 years. From 1826 to 1839 he lived in England, where, in conjunction with John Braithwaite, he constructed a locomotive engine for the Liverpool and Manchester Railway (1829). He also invented the caloric engine (1833), a screw propeller (1836), and improved appliances for naval steam engines. In 1839 he sailed for the U.S.A., where he became a naturalised citizen in 1848. He built the first Amer. armoured turret ship, the *Monitor*, which was launched in 1862 and fought a month later with the Confederate ram, the *Merrimack*. E. also studied torpedo boats and sun motors and pub. *Solar Investigations*, 1875; and *Contributions to the Centennial Exhibition*, 1877. See life by W. C. Church, 1890.

Eriocsson, Lail, son of Erie the Red (q.v.), is said to have furthered the explorations made by his father in Greenland. According to a Norse saga he is said to

have been blown off his course in about AD 1000 and found an unknown land to the W. Some say that this land included Helluland (Labrador), Markland or Woodland (possibly intended for Nova Scotia), and Vinland or New England. However that may be, other voyages followed, and apparently Norsemen got as far S. as the gulf of St Lawrence, perhaps even farther. Eric the Red's Greenland settlement as a result, mysteriously disappeared in the 13th cent., and only with the voyage of Columbus did Europe really discover the New World. See VINLAND. See also A. Williams, *Romance of Early Exploration*, 1904-6; J. Winsor, *History of America, Arctic Exploration and Greenland*, 1880-9.

Eridanos, see Po.

Eridu, ancient city, 5 m. SW. of Ur (S. Iraq). After preliminary investigations by Loftus in 1850 the site, modern Abu Shahrain, was excavated by Thompson and Hall (1918-19) and by the Iraqi Directorate of Antiquities (1938-41) revealing a *ziggurat* (q.v.), and a series of superimposed temples dating from prehistoric to Neo-Babylonian times during which the city was occupied as the seat of the worship of the god of the deep, Ea (Enki). See EA.

Erie, co. seat of Erie co., Pennsylvania, U.S.A., on Lake Erie, 148 m. N. of Pittsburgh and 80 m. SW. of Buffalo. It is situated on many railway lines. It has an excellent harbour, and is a well-built city. Its chief products are lumber, coal, iron-ore, petroleum, fish, and the city's varied manu. Foundry and machine shop products, engines, silk goods, and washing machines are shipped. One of its parks is the site of a Fr. fort erected in 1749. This fort was built on Presque Is. by which the fine natural harbour is formed. Pop. 130,803.

Erie, Lake, the most southerly of the Great Ls forming the St Lawrence system in N. America, lying between Canada and the U.S.A. It is bounded on the N. by Ontario, on the S. and SE. by Ohio, Pennsylvania, and New York, and on the W. by Michigan. It is connected with L. Ontario by the Niagara R., and with L. Huron by the Detroit and St Clair R.s. It is 341 m. long by 30 to 60 m. broad, its area being 9940 sq. m. It is 573 ft above mean sea-level. Its waters are shallow, the greatest depth being 210 ft. On the Amer. side of the L. are the cities of Buffalo and Cleveland.

Erie Canal (now New York State Barge C.), in New York, U.S.A., connects Lake E. at Buffalo with the Hudson R. at Albany and Troy and passes Utica, Syracuse, and Rochester. It was begun in 1817 and completed in 1825, at a cost of over 7 million dollars, the construction being superintended by De Witt Clinton. The length of the system is 525 m. and there are 84 locks. E. C. functioned as a toll waterway until 1882; later railroad competition, its inadequate navigability, and disclosure of a fraudulent canal administration brought about plans for its conversion, with its branches, into the nt Barge C. system. The original

width and depth were 70 ft by an average of about 9 ft, but much money has been expended upon further improvement, in order to allow a shipping-way for vessels of 1000 tons and upwards, and it is now 150 ft broad and has an average depth of 12 ft. Together with the Champlain, Oswego, and Cayuga-Seneca C.s it constitutes the New York State Barge C. System, which is the main route by which grain is brought to New York.

Erie Railroad Company operates a main railway route between New York (New Jersey) and Chicago, Illinois, with branches to Buffalo, Cleveland, Dayton, etc. It holds the capital stock of a number of subsidiary railway C.s and of 4 coal C.s. The latter are the source of much of its fuel supply, and their output forms a large portion of the coal-carrying trade.

Eries, Iroquoian tribe of N. America, now extinct, who formerly occupied the E. and S. shores of Lake Erie. They were nearly exterminated by the Iroquois league in 1656, the survivors of the struggle afterwards joining the Senecas.

Erigena, Johannes Scotus (c. 815-c. 877), medieval philosopher and theologian, probably a native of Ireland. His real name was J. S., E. or Ierugena being an adopted surname, apparently connected with the word Erin (q.v.), and signifying Irishman. Nothing definite is known about his early life. About 846 he visited the court of Charles the Bald, where he became the head of the *schola palatina*. His earliest work that has come to us is *De divina praedestinatione*, which was vehemently attacked on account of its unorthodoxy, and was censured at the councils of Valence (855) and Langres (859). At the request of Charles the Bald, he then trans. the writings of Dionysius the Areopagite. His greatest work was *De divisione naturae*, which was described by Honorius III (1225) as 'swarming with worms of heretical perversity.' E. argues that Universe or God is the ultimate unity of all things, and that all things are worked out through the divine processes. Revelation or religion forms a prominent part in the divine process, while reason or *intellectus visio* is the prime faculty of man. Haméau fixes E.'s death at about 877, the date of the death of Charles the Bald. There is a most improbable story that about 882 he visited Oxford at the request of Alfred the Great and became the abbot of a monastic school at Malmesbury, where he was stabbed to death by his pupils. The complete ed. of his works was pub. by Migne in 1853 in *Patrologiae cursus completus*, vol. cxxii. *De divisione naturae* has been ed. by Thomas Gale (1861) and C. B. Schlüter (1838). The *De divina praedestinatione* was pub. in Mauguin's *Veterum auctorum . . . opera et fragmenta* (1650) and his poems in L. Traube's *Poetae Latini aevi Carolini* (vol. II, 1896). See St René Tallandier, *Scotus Erigena et la philosophie scholastique*, 1843; T. Christlieb, *Leben und Lehre des Johannes Scotus*, 1860; Alice Gardiner, *Studies in John the Scot*, 1900; and H. Bett, *Johannes Scotus Erigena*, 1925.

Erigeron, large genus of the Compositae; most of the species are indigenous to N. America. *E. philadelphicus* is found in the U.S.A., where it is used as a medicine, possessing stimulant and diuretic properties. *E. acris* occurs in Great Britain, and with sev. other plants is known as fleabane; it has a strong scent which is said to keep away these insects.

Erin, anct name for Ireland. The form was originally Eriu, of which Erinn was the dative case. Eriu later became a dissyllable, Elre. It has been suggested that the word originated from Elre, the wife of MacCool, one of the kings reigning in Ireland at the time of the coming of the Milesians. The name gained popularity through the writings of Thomas Moore.

Erinaceus, see HEDGEHOG.

Erinite (arsenate of copper), occurring in concentric and mammillated layers, is bright green in colour, with a sp. gr. of 4.0 to 4.1. It is found near Limerick.

Erinna (4th cent. BC), Gk poetess, b. at Telos. The belief that she was contemporary with Sappho has now been abandoned. Only fragments of her poems remain, but these were held by the Greeks to rank with those of Homer. Her best-known poem is the *Distaff* which was written in a mixture of the Aeolic and Doric dialects but of which only 4 lines remain. *E. d.* at the age of 19. See *E. Diehl, Anthologia Lyrica Graeca*, 1949.

Erinyes, see EUMENIDES.

Eriophorum, genus of Cyperaceae, grows in N. lands of temperate climate. The

heaths, and the long cottony tufts of hair are sometimes used for stuffing cushions.

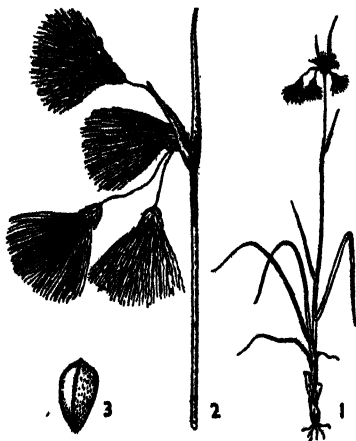
Eriostemon, genus of Rutaceae which flourishes chiefly in Australia. *E. obovatus*, *E. bazifolius*, and others, are evergreen shrubs, cultivated in greenhouses for their pretty pink and white blossoms.

Eriphyle, daughter of Talauus, and the wife of Amphiarauus the seer, who tried to evade joining the Seven against Thebes (g.v.). E., bribed by Polyneices with Harmonia's golden necklace, betrayed Amphiarauus, and was murdered by her son Alcmæon for his father's death.

Eris (Lat. *Discordia*), Gk goddess of strife, the friend and sister of Ares (Mars). She sowed dissensions among the gods, and was expelled from heaven by Zeus. Not invited to the nuptials of Peleus and Thetis, she threw the golden apple, *detur pulchriori*, into the assembly and caused the rivalry between Hera (Juno), Aphrodite (Venus), and Athene (Minerva). Paris awarded it to Venus, who rewarded him with Helen, which caused the Trojan war.

Erith, bor. of NW. Kent, England, situated on the R. Thames, 12 m. E. of London, and formerly an important naval station. E. is now an extensive industrial centre, with wharves, general engineering, and manufs. of cables, electrical instruments, plastics, chemicals, radio and television receivers, asbestos-cement, gypsum, wood-preserved, paint, toys, and unboulding sand. There are seed crushing mills and Doulton works. Pop. 48,000 (1954).

Eritrea, official name of ex-It. colony on the African coast of the Red Sea. It extends from Ras Kasar, a cape in 18° 2' N., to Ras Demolra in 12° 42' N., a distance of about 650 m.; now a part of the Federation of Ethiopia and Eritrea. Inland the territories of Sudan, Ethiopia, and Fr. Somaliland form the boundaries; the boundaries towards Egypt were determined by a protocol in 1891, and towards Ethiopia by the treaties of 1889 and 1891. E. consists of a high mountainous hog's-back interposed between the Red Sea and the Sudan flanked on E. and W. by flatter regions. The mts range up to 10,000 ft, and Asmara (the cap.) stands 7800 ft above mean sea level. Three distinct climatic zones are found in the ter.: that of the coastlands, that of the escarpments and valleys, and that of the high plateau and Alpine summits. The first one is characterised by great heat and humidity; the second has a more temperate climate, but considerable variation of temp. occurs owing to nocturnal radiation; a moderately cool climate prevails in the third zone. The flora in the zones is what would be expected from the climate, ranging from a tropical nature in the low country to temperate on the plateau. The lion, civet, leopard, camel, and numerous species of antelope are found. There are no navigable rvs. in E.; the chief streams are the Setit, the Mareb, the Baraka, the Anseba, and the Hadasi. Semi-nomadic shepherds form the pop. of the plains and foothills; Afars and Somalis are found chiefly in the S.; whilst the



ERIOPHORUM: COTTON-GRASS

1. Plant. 2. Inflorescence. 3. Seed.

Brit. species, *E. angustifolium*, *E. latifolium*, are called cotton-grass, or cotton-sedge, and *E. vaginatum*, Hare's-tail. They are to be found in marshy and sedgy

plateau is inhabited by Ethiopians. The nomadic tribes are largely of Arab or Hamitic stock, but include sev. tribes of negro origin. Sheep, goats, and camels are kept by the tribesmen, and the products include palm nuts, hides, and some ostrich feathers. Some gold is mined in Hamasien. There are exports of salt. Pearl fishing is carried on at Massawah and the Dahlak archipelago. The prin. tns on the coast are Massawa, Assab, and Zula; those of the interior, Asmara, Mogolo, Saganetti, and Arrasa. The low country is suitable for pastoral

also then incorporated E. as a state or gov. (*See under ETHIOPIA.*) After 1 June 1936 the dists. of Tigré, Danakiland, and Hausa, formerly part of Ethiopia, were added to E. The lt. seat of gov. was Asmara, with 140,000 inhabitants. The religions of the native pop. are the Christian (Coptic rite) and the Mohammedan, and there are some Roman Catholics and a few Pagans. There are 75 m. of railway from Massawa to Asmara, 64 m. from Asmara to Keren, 53 m. from Keren to Agordat and 140 m. from Asmara to Biscia via Keren and Agordat. The



Imperial Ethiopian Embassy

HAILE SELASSIE I STREET, ASMARA

purposes only, but the intermediate zone and the high plateau are well adapted for the cultivation of crops. Irrigation works were carried on by the Italians in the lower zone in order to help intensive production by lt. farmer colonists. Pasture is abundant, and the pastoral pop. is partly nomadic. Massawa is connected with Asmara by railway, with Perim by cable, and with Addis Ababa by telegraph. Before the Second World War E. was governed by a civil governor who was responsible to the Ministry of Foreign Affairs at Rome. Italy took possession of the land in 1885, and it was formed into a colony 4 years later. It was from E. that a great part of Mussolini's effort was directed which resulted in the capture of Adowa (Adua) and finally of Addis Ababa, and the estab. by the act of 1 June 1936 of the new lt. colony of lt. E. Africa which

Italians made new motor roads from Massawa to Asmara and from Asmara to Keren, Agordat, and Sabderat. Wireless telegraphy stations were opened at Asmara, Massawa, Assab, and elsewhere. The total area of E. is 64,000 sq. m. and the pop. about 810,000 (Europeans 50,000). Massawa (15,000), the chief port, has a good harbour. Other centres are Keren (11,000), where were fought the decisive battles in the Second World War campaign in E., Decameré (9000), Adi Ugri, and Agordat. Asmara was captured by the Allies on 1 April 1941 (for full details see ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGN IN (1941)). Thereafter E., together with the other occupied lt. colonies, was administered by the Civil Affairs branch of the Army Staff, under a Chief Civil Affairs Officer with H.Q. at Cairo.

Eriu, see ERIN.

Erivan, see YEREVAN.

Eriza, see ERZINCAN.

Erkel, Ferenc (1810-93), Hungarian musician, studied at Pozsony and became a pianist and theatre conductor. He produced 10 operas with Hungarian librettos with which he estab. a distinctive national operatic style.

Erkko, Elias (1895-), son of J. H. E. Publisher of the Finnish daily newspaper *Helsingin Sanomat*; president of the International Association of Newspaper Editors; Finnish foreign minister at outbreak of Second World War.

Erlangen, Ger. tn in the *Land of Bavaria* (q.v.), in the Regnitz (q.v.), valley, 105 m. NW. of Munich. It has a castle (1704) and other good baroque buildings. The univ. (Protestant) dates from 1743. E. has prosperous industries, which originated in the settlement in the tn of Huguenots (q.v.), after the revocation of the Edict of Nantes (q.v.); textiles, tobacco, glass, and beer are manuf. Pop. 55,000.

Erlanger, Camille (1863-1919), Fr. composer; b. and d. in Paris. At the Conservatoire, he was under various masters and in Léo Delibes's class for composition. In 1888 he won the Prix de Rome with the cantata *Velléda*. During residence in Italy he sketched out *Saint-Julien l'Hospitalier* (a dramatic legend founded on a story by Flaubert), which came to be reckoned among his prin. works. Operas: *Kermaria*, 1897; *Le Juif Polonais*, 1900; *Le Fils de l'Etoile*, 1904; *Aphrodite*, 1906; *Hannele Matern*, 1908; *Noël*, 1911; *La Sorcière*, 1912; *Gioconda*, 1914.

Erlau, see ERLEN.

Erlingsson, Thorsteinn (1858-1914), Icelandic poet who brought into Icelandic poetry not only new ideas in matters of religion and social order, but an unusual softness and melody which set a distinctive stamp on all his work. In his satires he is influenced by Byron.

Erlkönig, Der, or **Erl-King**, mythical character who appeared in Ger. literature towards the end of the 18th cent. He is represented as a bearded giant with a golden crown, who lures little children and others to the unknown land of death. Goethe's ballad on the legend has been trans. into Eng. by Sir Walter Scott. Herder, in his *Stimmen der Völker*, 1778, confuses *elle* (Dan. *elf*) with *erle* (Ger. *alder*) in his trans. of *The Elf King's Daughter*. This error was perpetuated and the E. estab. as an alder wraith.

Ermak, see YERMAK.

Ermenario, see HERMANRIC.

Ermeland (anc. *Warmia*, or *Varmia*), dist. of central Europe, inland from the Frisches Haff (q.v.), now in Poland, in the provs. of Gdansk and Olsztyn (q.v.). In the 13th cent. it was a bishopric of the Teutonic knights (q.v.), with its seat at Frauenburg (now Frombork). It went to Poland in 1466, to Prussia in 1772, and to Poland again in 1945. The chief tn is Braniewo (q.v.). Area about 1700 sq. m.

Ermenonville, Fr. vil. in the dept of Oise, 7 m. from Senlis. Rousseau (q.v.), d. here. Pop. 440.

Erment, see HERMONTHIS.

Ermine, name given to the stoat (*Mustela erminea*) when it puts on its white winter coat. During the summer months the fur is a reddish-brown shading into white underneath, but in winter turns to pure white. The tail is black.

Ermine Street, anc. highway which ran from London via Lincoln to York and Hadrian's Wall (q.v.). It was one of four which were traditionally said to enjoy royal protection, and it coincided in part with the Rom.-Brit. road system.

Erne, Lough and River, situated in N. Ireland. The riv. rises in L. Gowna, in co. Longford, and flows generally northward, through L. Oughter until it enters Upper L. E., which is a shallow piece of water about 13 m. long containing numerous is. The riv. passes Enniskillen, and flows through L. E. finally emptying itself in Donegal Bay. L. E. is 42 m. long, is noted for its beauty, and contains trout and pike.

Erne, or Sea-eagle (*Haliaeetus albicilla*), species of Falconidae widely distributed over the Old World. Its diet consists chiefly of fish, but it will also play much havoc with young lambs. In general character and habit it is much like *Aquila chrysaetus*, the golden eagle, but it is smaller, has a longer beak and fewer leg-feathers. The eyrie is built on sea-cliffs difficult of ascent, and in the early spring contains 2 or 3 white eggs.

Ernest I (the Pious) (1601-75), 1st duke of Saxe-Gotha, was the son of John, duke of Weimar. He served in the Thirty Years War, and in 1640 won possession of the duchy of Saxe-Gotha.

Ernesti, Johann August (1707-81), Ger. philologist and biblical critic, b. at Tennstädt, Thuringia; educ. at the Saxon cloister school of Pforta and the univs. of Wittenberg and Leipzig. He was made prof. extraordinary of anc. literature at the univ. of Leipzig in 1742, prof. of rhetoric in 1756, and doctor of theology. By his erudition and method he paved the way for a revolution in theology. He was the founder of the grammatico-historical school; his best work was in hermeneutics. His influence and example inspired men greater than himself; his numerous works include trans. of the classics, and criticisms and trans. of the Bible.

Ernesti, John Christian Theophilus (1756-1802), Ger. scholar, b. Armstadt. He pub. eds. of Silius Italicus and Aesop, and a Ger. version of the prin. works of Cicero. His *Lexicon Technologiae Graecae Rhetoricae*, 1795, and *Lexicon Technologiae Romanorum Rhetoricorum*, 1797, are very good works of their kind.

Ernestine Line, branch of the house of Saxe, which was founded by Ernest (1441-1488), the eldest son of Frederick II of Saxony. By the 19th cent. the E. L. survived only in the houses of Weimar, Saxe-Meiningen, Coburg, Gotha, and Altenburg.

Ernie, Rowland Edmund Prothero, 1st Baron (1851-1937), politician and author, b. Clifton-on-Teme, son of a clergyman. Educ. at Marlborough and Balliol College,

Oxford, he was a fellow of All Souls from 1875 to 1891. From 1893 to 1899 he ed. the *Quarterly Review*, and thereafter till 1919 was Agent-in-Chief to the Duke of Bedford. Conservative M.P. for Oxford Univ. from 1914 to 1919, he was president of the Board of Agriculture from 1916 and in 1919 was raised to the peerage. He was president of the M.C.C., 1924-5. His pubs. include *Pioneers and Progress of English Farming*, 1887; *Dean Stanley*, 1893; *Letters of Edward Gibbon*, 1896; *H.R.H. Prince Henry of Battenberg*, 1897; *Letters and Journals of Lord Byron*, 1898-1901; *The Psalms in Human Life*, 1903; *Letters of Richard Ford*, 1905; *The Pleasant Land of France*, 1908; *English Farming, Past and Present*, 1912; *The Land and Its People*, 1925; and *The Light Reading of our Ancestors*, 1927.

Ernoldus, see ARNOLD.

Ernuil, or **Arnulf** (1040-1124). Fr. Benedictine monk, educ. at Bec under Lanfranc. He was made prior of Canterbury by Anselm, abbot of Peterborough in 1107, and bishop of Rochester in 1114. He was noted for his legal knowledge and his virtuous life. The reference to him in *Tristram Shandy* as a master of cursing is because of a curse which he mentions in his most famous work, a collection of documents concerning canonical law, etc., known as *Textus Roffensis* (now in Rochester Cathedral library).

Erodium, genus of plants, family Geraniaceae, which grows in temperate lands. Brit. species include *E. cicutarium*, Storks-bill, *E. moschatum*, Musk Storks-bill, and *E. maritimum*, Sea Storks-bill.

Eros, Gk god of love. Hesiod first mentions him, as one of the oldest gods, and as the most powerful. He brought harmony out of chaos by uniting the elements. Cronus laid a world-egg in the bosom of Chaos, according to Orphic mythology, and from this egg sprang E. This conception of E. is early. In later times he was the god of sexual passion, son of Aphrodite by Zeus, Ares, or Hermes. He was a wanton child, tormenting gods and men by his arrows, and often represented as blind. In art E. is a beautiful winged boy; he bears bow and arrows, and a burning torch. See CUPID, PSYCHE.

Eros, minor planet which was discovered by Witt at Berlin on 14 Aug. 1898 and has an orbit between the earth and Mars. Its mean distance from the sun is 1.46 times that of the earth; but as the eccentricity of its orbit is large, on those rare occasions when in opposition near perihelion, it could approach the earth to a distance of 16 million m. or less. It was therefore used for a series of observations for determining the sun's parallax in 1900-1 by Mr R. A. Hinks, and by the Astronomer Royal, Sir Harold Spencer Jones, in 1930-1; their investigations were completed in 1941 from the observations of 24 co-operating observatories in various parts of the world.

Erosion, Soil, see SOIL EROSION.

Erpe, Thomas van, also known as **Erpenius** (1584-1624), Dutch Orientalist, who was prof. of Oriental languages at

Leyden and founder of Dutch Arabic studies. He visited sev. univs. in France, Germany, Switzerland, and Italy. In Venice he studied Turkish, Persian, and Ethiopic. His *Grammatica arabica*, 1613, the 1st pub. in Europe, was for long a standard work. Other works: *Prooebiorum arabicorum centuriae II*, 1613; *Locmani sapientis fabulae*, 1615; *Grammatica ebraea generalis*, 1621. He also ed. Arabic historical texts and pub. the Arabic *New Testament*, 1616, and *Pentateuch*, 1622.

Erpeton, or properly **Herpeton**, name given to a genus of non-venomous serpents native to S. Asia.

Erratics, or **Erratic Boulders**, scattered blocks of rock which have evidently been removed by some agency from their original site. What this agency was for a long time employed the minds of scientists, and sev. theories were evolved. The earliest theory was that they had been dislodged from their original positions and transported by the agency of a flood; this is known as the diluvial hypothesis. This theory is now generally discredited. The next theory was brought forward by Sir C. Lyell, who thought that the transport and distribution had been effected by floating icebergs. A widespread submergence of the land of the European continent must have been necessary before this could have occurred. The third theory, that of glacial action, is now generally held as the result of the investigations which were carried out among the Alps, where such E. abound. According to this theory E. B. are isolated masses of rock which have been borne along by ice-sheets for some distance from their original position; the ground moraine which accompanied them has been washed away in course of time. E. B., or perched blocks, as they are sometimes called, are very familiar objects in Alpine glacier dists., but are also easily recognised in regions where there is now no ice. They bear all the characteristic marks of the action of ice, such as erosion, striation, and smoothness of outline. Not only are B. of hard rock transported by ice, but huge masses of stratified rock have been torn from their beds by the same agency. Thus large blocks of Scandinavian rocks are scattered over the plains of Denmark, Prussia, and N. Germany; the masses of chalk in the cliffs near Cromer are well known, and a mass of chalk of about 2,000,000 cub. ft in bulk has been transported a distance of about 9 m. at Firkenwalk. The statue of Peter the Great at St Petersburg (Leningrad) had for its pedestal an E. B. hewn into shape. The B. at Mouthy in the canton of Valais contains 7063 cub. ft, and is large enough to support a small house on the top; it is known as the 'Pierre de Marmettes'. This huge mass has been transported by the action of ice for a distance of over 30 m. down the valley. E. B. are very numerous on the shores of the Firth of Forth, Scotland. Other well-known examples are the fragments of Shap Granite which have been transported by land ice from the Lake District of England to various parts of the Midlands.

Erroll, Earl of, Scottish title, borne by the Hay family since 1452 when Wm Hay was made E. of E. The E. of E. is hereditary lord high constable of Scotland, an honour given to Sir Gilbert Hay in 1315. The present holder of the title is Diana Denyse Moncreiffe (*b.* 1926), Countess of E. in her own right, who succeeded to it in 1941.

Erromanga, is. of the New Hebrides (*q.v.*), about 35 m. long and 25 m. broad. It is well watered and extremely fertile. It has been called 'the Martyrs' Isle' on account of the many missionaries who have laid down their lives there, including John Williams and James Harris, killed in 1839, George and Ellen Gordon, killed in 1861, and James Gordon, killed in 1872. Pop. about 1800.

Error, in law, is any mistake in fact, in law, or in the form of process which needs to be rectified either by the court before which the action is tried or by a court of appeal. Since 1875 all appeals in civil suits must be made to the court of appeal. In criminal procedure, an E. in the indictment may be cured by the court which tries the case, or recourse may be had to the court of criminal appeal.

Errors of Observation. The results of any determination of a physical or chemical quantity are always affected by E. due to the inaccuracy of the O. The sources of E. may be classified broadly as:—

(1) Inaccurate methods; (2) defective instruments or impure materials; (3) influence of conditions; (4) defects of the observer resulting in the *personal E.* E. due to the first cause can only be detected by special investigations, but may and can be removed by a modification of the method. Instrumental defects can be detected by special tests and a correction can be applied. Thus a balance may not be correct; but a careful investigation will show how far it is inaccurate, and what correction should be applied, provided the E. is not due to a lack of sensitiveness, for which no allowance can be made. In astronomy the changes of the weather, e.g. fluctuations in temp. or barometric pressure, will disturb the amount of refraction; and in the processes of weighing and measuring alterations of temp. will have a very marked effect. If it is possible to do so, the conditions should be reduced to some standard value, or the conditions should be noted and the necessary corrections calculated from a knowledge of the numerical relation between the quantity required and the conditions. The E. due to the observer are of 2 classes: (1) Mistakes which consist in a wrong registration of the value measured. Such E. are preventable and can be detected by repetition or checking by another observer. (2) Those due to the imperfections of the senses, such as defective vision, lack of ability to seize the exact instant of an occurrence, etc. The E. of an O. are usually very numerous, but they differ in their influence on the final result. Some always affect the result in the same direction (though not to the same extent) and are called *constant E.* Others sometimes

increase and sometimes diminish the result, and are called *accidental or random E.* Mistakes and constant E. can be removed; and it is therefore more advantageous to give time and attention to their removal than to make an effort to allow for these E. by calculation. (Constant E. can be detected by change of material, of method, of instruments, or of the observer. When the presence of a constant E. has been detected, its cause must be found and steps must be taken to remove it. Accidental E. are often subdued by making a large number of O.s and taking the arithmetical mean or average of the results obtained: the assumption being made that the number and magnitude of the E. in one direction are equal to the number and magnitude of the E. in the other direction. But this method of subduing accidental E. is not applicable to all cases; and recourse must sometimes be had to the method of least squares (*q.v.*). Many determinations of physical and chemical quantities involve subsidiary measurements. It is important that the subsidiary measurements should be made in such a way that the E. of those measurements have the least effect on the final result. Thus in experiments involving the use of a tangent compass or galvanometer the E. in making a reading will have the least influence on the result if the deflection is about 45°.

Erse, early Scottish corruption of 'Irish', which was applied to the Gaelic kings and the Gaelic dialect of the Highlanders by the Scottish Lowlanders. The term E. is now obsolete, and is not used by the Irish themselves. See GAELIC LANGUAGE.

Ersekújvár, see NOVÉ ZÁMKY.

Erskine, Ebenezer (1680–1756), founder of the Secession Church in Scotland, *b.* in Berwickshire. He was preacher at Portmoak in Kinross-shire from 1703. After taking part in the Marrow Controversy (*q.v.*) on the evangelical side, he was transferred to Stirling in 1731. With three others he was suspended in the patronage dispute for upholding the right of the people to choose their own pastor. He was deposed in 1734, and although the sentence was revoked he would not return, and was finally deposed in 1740. Before this he had formed the Associate Presbytery, the origin of the Secession Church, in 1733. The latter was split up in 1747 into Burghers and Anti-Burghers, of which E. headed the former.

Erskine, Henry (1746–1817), lawyer, *b.* Edinburgh, 2nd son of the earl of Buchan. After a distinguished career at the Bar he became lord advocate. He was noted both for his wit and his oratorical powers.

Erskine, John (1695–1768), jurist, called to the Bar in 1719. After a distinguished career there he was made prof. of Scots law at the univ. of Edinburgh in 1757, and held this post till 1763, when he resigned. His 2 prin. works are still amongst the authorities on Scots law: *Principles of the Law of Scotland*, 1754, and *Institutes of the Law of Scotland*, 1773.

Erskine, John, of Dun (1509-91), reformer, son of the laird of D., Sir J. E.; was educ. at King's College, Aberdeen. The reformers Wishart and Knox were his personal friends, and all through the reign of Mary Queen of Scots, and part of the following reign, E. was a leader and a reconciling influence in the religious quarrels of the time. He held the office of superintendent of the reformed Church of Scotland for Angus and Mearns from 1560 to 1589, and was sev. times elected moderator of the general assembly, although a layman. He was a member of the king's council from 1579.

Erskine, Thomas, 1st Baron Erskine (1750-1823), lord chancellor, served at sea, first as midshipman and then as lieutenant, from 1764 to 1767, when he retired from the senior service and purchased a commission in the 1st Royal Regiment of Foot. Returning to England in 1772, he studied law at Lord Mansfield's suggestion. Six years later he was called to the Bar, and at once achieved great success. In 1783 he took silk, and within 8 years was earning £10,000 a year, the greatest income hitherto made by any lawyer. He entered parliament in 1783, but lost his seat in the following year. He was again returned to Westminster in 1790, but was too much occupied with his professional duties to take an active part in the proceedings of the House. In the Grenville administration (1806) he became lord chancellor, and he was one of the commissioners appointed to inquire into the charges brought against the Princess of Wales. He retired with the ministry in the next year, and did not again hold office. In 1820 he took an active part in securing a fair trial for the queen. For his biography, see J. C. Campbell, *Lives of the Lord Chancellors and keepers of the Great Seal*, 1845-69.

Erstein, Fr. tn, cap. of an arron., in the dept of Bas-Rhin, on the Ill. It manufs. sugar and textiles. Pop. 5500.

Eruptive Rocks, see IGNEOUS ROCKS.

Ervine, St John Greer (1883-), playwright, critic, and novelist, b. Belfast. Moving to Dublin as a young man, he became manager of the Abbey Theatre in 1915. His best-known plays of this period are *Jane Clegg*, 1911, and *John Ferguson*, 1914. In the First World War he served with the Dublin Fusiliers. After the war he settled in London and wrote *Mary, Mary, Quite Contrary*, 1923, and *The First Mrs Fraser*, 1931, a highly successful comedy; others were *People of Our Class*, 1934, *Robert's Wife*, 1937, *Friends and Relations*, 1940, and *Private Enterprise*, 1947. Among his novels are *Changing Winds*, 1917, *The Wayward Man*, 1927, and *Sophia*, 1941. In 1956 he pub. *Bernard Shaw, his Life, Work, and Friends*, a brilliant study, and he also wrote biographies of Gen. Wm Booth and Viscount Craigavon, as well as sev. books on theatre craft. Dramatic critic for various newspapers, from 1933 to 1936 he was prof. of dramatic literature for the Royal Society of Literature, and he held honorary degrees of Belfast and St Andrew's.

Erymanthus, or **Olonos**, mt of Greece, situated in Arcadia, 20 m. S.W. of Patras, 7283 ft high.

Eryngium, genus of umbelliferous plants, occurs in tropical and temperate lands, and consists principally of perennial spiny herbs with flowers in dense heads. *E. maritimum*, the sea-holly or Eryngo, is a native of sandy sea-shores of Europe, and is found in Great Britain; in England it bears the additional names of sea holver and sea holme. The root is candied as a sweetmeat, and has been used in medicine as a tonic and diuretic.

Erysimum, genus of cruciferous plants, contains herbs with many-flowered racemes, all of which flourish in the N. temperate regions. *E. cheiranthoides*, the treacle-mustard, occurs in Britain. *E. perofskianum* is an orange-flowering annual; *E. pumilum* and *E. rupestre*, yellow-flowering, and *E. linifolium*, purple-flowering perennials grown in gardens.

Erysipelas, see SKIN—Diseases.

Erythema, morbid redness of the skin due to congestion of the capillaries, sometimes inflammatory in origin, and disappearing when pressure is made by the finger or a piece of glass, and promptly re-appearing on removal of pressure. There are many causes of E. It may be due to local causes, as heat or cold, friction, accumulation of sweat, or other local irritants; the result of changes in the blood vessels themselves; to substances absorbed through the alimentary canal, such as special articles of diet, and other causes of alimentary toxemia. After the condition has lasted for some time, pigment is deposited in the skin, and the colour due to this does not disappear on pressure. E. is seen in association with infections particularly measles, scarlet fever, typhus, typhoid, and cholera. The treatment of E. consists in treating the cause and in local applications of cooling lotions, powders, or a bland ointment. The appearance of E. is very variable, both in different individuals and in different parts of the body. *Erythema nodosum* is a special condition, with red, oval, raised spots, chiefly on the lower extremities. The lumps are painful, and run their course in from 2 to 4 weeks. Although painful, they do not suppurate or burst. Rheumatism is a common cause, and should be treated as such.

Erythraea, see CENTAURIUM.

Erythrina, leguminous genus of tropical trees and herbs, with bright red flowers and frequently with prickly stems. *E. caffra*, the Kaffirboom, produces a good timber. *E. crista-galli*, the Common tree of Brazil, is nearly hardy.

Erythromycin, see ANTIBIOTICS.

Erythronium, see DOG'S TOOTH VIOLET.

Eryx, aetn tn which stood on a hill 10 m. NW. of Trapani (q.v.), in Sicily. It was famous for its magnificent temple of Aphrodite, whence the goddess was called *Erycina*. In the Middle Ages the site was occupied by a tn called Monte San Giuliano, and to-day is occupied by the small tn of Erice.

Eryx, genus of oviparous snakes, closely allied to the genus *Boa* in the family Boidae, but the species of *E.* differ from those of *Boa* in having a very short obtuse tail and narrower ventral plates. They occur in Asia and Africa.

Erzberg, see ERZBERG.

Erzberger, Matthias (1875-1921), Ger. politician, b. Buttenhausen and educ. at Freiburg. A member of the Catholic Centre party, he entered the Reichstag in 1903. As secretary of state, in 1918 he conducted the Armistice negotiations on Germany's behalf with the Allies, the terms of which he signed. In 1919 he became finance minister in the new republican gov. In 1920 he resigned and was assassinated a year later.

Erzerum, see ERZURUM.



ERYTHRINA CRISTA-GALLI

Erzgebirge (Czechoslovak Krušné Hory), chain of mts in central Europe, which separates Bohemia and Saxony (now Bohemia and the dists. of Chemnitz and Dresden). The name means 'Ore Mountains,' and silver, lead, copper, tin, and other metals were formerly mined, but the deposits have been largely worked out. There now are important uranium mines. The E. stretches ENE.-WSW. for some 80 m., and is bounded on the SW. by the Thüringerwald and on the NE. by the Sudetic Mts (q.v.). On the N. slopes there are fertile valleys; the central part of the chain forms a plateau, while the S. slopes are very steep, in some places almost perpendicular. The highest summit is the Keilberg (over 4000 ft). During the Second World War, following the loss of Jena and Erfurt (q.v.) in April 1945, the Germans retired SE. into the E., although they still clung to the tn of Chemnitz as a pivot to the N., where the South Saxon armies were still putting up a stiff resistance to the Amer. First Army. On the central Ger. front, although elements of the W. allied forces continued to push forward to meet the Russians at Torgau, it was necessary for the main W. allied armies to halt on the lines of the

Elbe and Mulde, through the E. See WESTERN FRONT IN SECOND WORLD WAR.

Erzincan, tn in Turkey, situated on the Kara Su, or the W. upper branch of the Euphrates, about 80 m. WSW. of Erzurum, exports fruit, sheep, oxen, and horses. It was taken by the Russians on 26 July 1916. There are frequent earthquakes. In those of Dec. 1939 which occurred over much of E. and N. Anatolia, E. was for the most part destroyed and 10,000 persons are said to have perished. The reconstruction of the tn was begun soon afterwards slightly N. of the old tn. Pop. (tn) 18,000; (il) 216,413.

Erzurum, il and tn of Asiatic Turkey, 110 m. SE. of Trebizond, occupying the centre of the Armenian plateau. The country (pop. 521,836) is mainly agric., though salt and coal are found; there are iron, saline, and sulphur springs. An extensive trade in cattle, horses, mules, furs, wheat, etc., is carried on. The tn has a citadel, founded about AD 415 by the Emperor Theodosius the Younger, many mosques and former Dervish monasteries; the former industries have declined; there is petroleum in the vicinity. The chief industries are iron and copper working. In 1517 it was acquired by the Turks, and the Russians took it in 1829 and again in 1878, but by the treaty of Berlin it was restored to Turkey. During the First World War E. was seized by the Russians in Feb. 1916 in their campaign against the Turks. After the Russian revolution the Turks recaptured the place in Mar. 1917. Pop. 69,499.

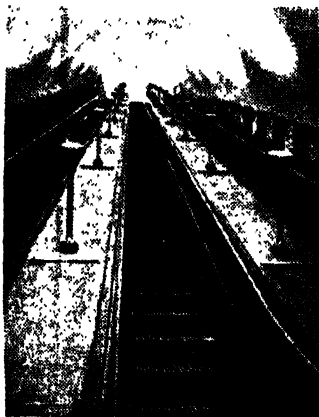
Esarhaddon, king of Assyria, 681-669 BC, son and successor to Sennacherib (q.v.). He invaded Egypt, reaching Memphis and Thebes. In a series of campaigns he subdued the Median princes, with whom he made treaties designed to ensure their loyalty to his sons Ashurbanipal and Shamash-shum-ukin, whom he chose to succeed him as kings of Assyria and Babylonia respectively. See ASSYRIA.

Esau, 'hairy,' son of Isaac and Rebecca (also called Edom), and elder twin of Jacob, so called because he was red and hairy at birth; he sold his birthright to his brother Jacob for a 'mess of red pottage,' whereupon Jacob impersonated his brother and seized from his blind father the blessing intended for the first-born. E. became a hunter, and an ancestor of the Edomites (q.v.), who were for centuries enemies of the Hebrews, inhabiting Mt Seir, S. of the Dead Sea.

Esbjerg, seaport in Denmark on the N. Sea, W. coast of Jutland. A harbour was constructed here in 1868 to give Jutland an export haven in place of Schleswig-Holstein, lost in 1864, and to this it owes its rapid rise. It has valuable fisheries, and is an important export centre, chiefly for fish, eggs, bacon, and cattle. Pop. 50,920.

Escalators, moving stairways for transport of passengers. Owing to the fact that stairways can carry more passengers an hour than lifts, E. are rapidly taking

the place of lifts on underground railways. The E. consists of a number of steps fastened to an endless belt which follows the incline of the stairway. Each step consists of a separate small trolley running on 4 rollers, which are staggered at the angle of the stairs; the top of the trolley consists of an inverted L-shaped step, which sinks to level at the top and bottom of the stairway. A hand-rail travels round at the same speed as the stairs and is of flexible composition. Powerful electric motors work the moving stairways, and self-operating brakes are fitted to meet the possibility of a sudden breaking of a coupling or of a gear wheel.



ESCALATORS

One of the standard types of escalator in use on London's Underground system, showing 3 staircases

Escallonia, genus of Saxifragaceae, consists of about 50 shrubs with alternate evergreen leaves and red or white flowers. All the species inhabit S. America, on the high grounds especially in Alpine regions. Garden species are chiefly hybrids; *E.* x 'Donard' varieties.

Escanaba, port and railway centre, co. seat of Delta co., Michigan, U.S.A., 60 m. S. of Marquette on a N. arm of Green Bay, in lumber and resort area with commercial and sport fishing. It ships iron ore and manufs. veneer, paper, and foundry products. The Upper Peninsula State Fair is held here. Pop. 15,200.

Escapement, see CLOCK; WATCH.

Escau, see ASAR.

Escarpment, in geology, a steep slope representing the eroded edge of a hard stratum which is inclined at a low angle to the general slope of the land surface.

Escaut, see SCHELDT.

Esch, or **Eschen der Aizette**, tn situated in the grand duchy of Luxembourg, with coal and iron mines. Pop. 25,000.

Eschalot (botanical), the shallot (q.v.). Said to have been brought from Ascalon in Syria by the Crusaders.

Eschatology (from Gk for 'last' and 'a discourse'), general title for the religious doctrines concerning the end of the world, i.e., in Christian teaching, the Resurrection of the Dead, the Second Advent (q.v.) or Parousia of Christ, the General Judgment, Heaven, and Hell. E. existed among all the nations of antiquity, whether dark and ill-defined, as in the Gk, or elaborate as in the Egyptian religion; and with it grew up, more or less definitely, the idea of retribution. The Christian teaching has its roots in the O.T. and Jewish thought, expanded and amplified by Christ, who clearly taught that He was to return as the Final Judge. Jewish teaching was much developed by Messianic prophecy and Apocalyptic teaching, which fl. between the time of the Maccabees and the coming of Christ. A. Schweitzer, in his *Quest of the Historical Jesus*, 1911, argued that Christ was a noble but deluded Apocalyptic prophet, proclaiming an *Interimsethik*. This argument has been refuted as a gross exaggeration, but it exploded the Liberal Protestant conception of Christ as a mere gentle and kindly moralist insisting on the Fatherhood of God. Emphasis has more recently been laid on the eschatological outlook of the whole life and worship of the early Christians. For them the last times had already begun, and in a certain sense they were already risen with Christ who had already come again with the Holy Spirit in the Church. This is known as Realized E. But the teaching of the N.T. and the tradition of the Church cannot be confined or reduced to this (cf. 2 Thess. ii. 2). For those who do not recognise eternal punishment as a scriptural doctrine see UNIVERSALISTS and CONDITIONAL IMMORTALITY, and concerning the intermediate state see PURGATORY; PARADISE. Eschatological speculations are to be found in More's *Utopia* and Plato's *Republic*. See ADVENT; JUDGMENT; RESURRECTION; etc.; see also F. Bennet, *Respecto*, 1926; G. Dennis, *The End of the World*, 1931; C. H. Dodd, *The Apostolic Preaching*, 1944; E. Hodous, *The N.T. Teaching on the Second Coming* (in *A Catholic Commentary*), 1953.

Escheat (Fr. *echoir*, from Lat. *cadere*, to fall or happen). This term is applied to an incident of feudal tenure whereby land reverted to the lord when there was no tenant qualified to perform the services. Up till 1870 E. took place in England when the tenant was convicted of a capital felony; after that date this kind of E. was abolished. E. still takes place for want of next of kin when the owner of land dies intestate.

Eschenbach, see WOLFRAM VON ESCHENBACH.

Eschscholtz, or **Escholtz Bay**, 30 m. long, 7-16 m. wide, name of an inlet of Kotzebue Sound, situated in Bering Strait, Alaska. Through this passes the parallel of lat. 67° N., which is the Arctic Circle boundary.

Eschscholtzia, genus of beautiful annuals, family Papaveraceae, and natives of N. America. *E. californica* is the Californian Poppy (q.v.). *E. caespitosa* is a favourite yellow poppy for gardens.

Eschwege, Ger. tn in the Land of Hessen (q.v.), on the Werra, 112 m. NE. of Wiesbaden (q.v.). It has a soap industry, and there are coal and iron mines in the dist. Pop. 24,000.

Eschweiler, Ger. tn in the Land of North Rhine-Westphalia (q.v.), 37 m. SW. of Düsseldorf (q.v.). During the Second World War it fell to Amer. troops after heavy fighting on 22 Nov. 1944. It has important coal, iron, zinc, and machinery industries. Pop. 35,000.

Escobar y Mendoza, Antonio (1589-1669), Sp. churchman and writer. Educ. by the Jesuits, he entered the Society at the early age of 15. He was famous as a preacher. His writings, which fill 40 folios, belong to the field of moral theology, and were not popular with many Catholics, who considered that they tended to inculcate a loose system of morality. His statement that purity of intention may be a justification of actions which are contrary to the moral code and to human laws was much ridiculed in France by Molière, Boileau, La Fontaine, and Pascal.

Escoffier, Auguste (1847-1935). Fr. maître-chef, began his culinary career in his uncle's restaurant in Nice. Later he was in the service of a Russian grand duke, and then *chef de cuisine* to the general staff of the Rhine Army in the Franco-Prussian War, 1871, and to Marshal MacMahon at the Champs Élysées. His career in England began after he had left the Grand Hotel, Monte Carlo, to accompany Mr Ritz to the Savoy, London. The acme of his career was reached at the Carlton, and to him belongs the credit for inventing the *bombe Nero* or flaming ice, *entremets fraises à la Sarah Bernhardt*, and *pêche Melba*. Wrote *The Guide Culinaire*, 1903, and *Ma Cuisine*, 1934.

Escomb, vil. in Bishop Auckland urb. dist., co. Durham, England, with a perfectly preserved 7th cent. Saxon church, built largely of stone from a nearby Roman station (*Vindonia*). Pop. (of par.) 1100.

Escorial, El, or the Escorial (probably from Lat. *scoriae*, slag), celebrated Sp. building, situated in the prov. of Madrid, 31 m. NW. of Madrid city. It stands 3000 ft above sea-level on a SE. slope of the Sierra de Guadarrama (q.v.). It was erected (1563-84) by Philip II (q.v.), and dedicated to St Lawrence (q.v.), on whose day (10 Aug.) in 1557 the Spaniards defeated Henry II (q.v.) of France at St Quentin. The immense structure, built of granite and measuring 680 ft by 530 ft, is shaped to resemble the gridiron on which St Lawrence was martyred. It contains a monastery, a basilica, a palace, a pantheon in which are the tombs of the Sp. kings, a library, and splendid collections of paintings and tapestries. The (non-official) univ. of E. E. is known for its law faculty. The surrounding vil. is called San Lorenzo del E. (pop. 6500).

Escosura, Patricio de la (1807-78), Sp.

novelist and poet, b. Madrid. He wrote sev. plays of very unequal merit, amongst which may be mentioned: *Barbara de Blomberg*, *Las Flores de Don Juan*, and *El Tío Marcelo*. His best-known novel is a tale of Philip II, entitled *Ni Rey ni Roque*.

Escrow, see DEED.

Escuage, or **Scutage** (Lat. *scutum*, shield), in feudal times a money tax frequently levied by the crown as a substitute for the personal service of a knight or vassal. First exacted in 1159 and restricted by Magna Carta. It was quite usual for a knight to pay this fee by way of compensation for his personal service.

Escuintla, tn of Guatemala (q.v.), situated 30 m. SW. of the city of Guatemala, with which it has road and railway communication. It is the cap. of the dept. of the same name, carries on a considerable trade in sugar, cotton, coffee, and cattle, and is a popular winter resort. Its port is S. José on the Pacific. Pop. 14,000.

Esculle (Aesculle) Acid, acid obtained from the bark of horse chestnut (*Aesculus hippocastanum*) and similar trees.

Escutrial, see ESCORIAL.

Escutcheon, heraldic term for the shield on which arms are painted. The term inescutcheon is used to denote a shield charged upon the E. either as an ordinary charge or as an augmentation of honour. An inescutcheon of pretence or *en surcoat* is placed in the centre of an E. and is charged with the arms of an heraldic heiress married to the bearer of the E.

Esdraelon, or **Emek Jezreel**, noted plain of Israel, lying to the SE. of Acre. It is bounded by Mt Carmel on the W., Gilboa on the SE., and the Galilean highlands on the N., and stretches across central Palestine with an average width of 10 or 12 miles, forming a break between the mts of Galilee on the N. and those of Samaria on the S. Formerly little more than a malarial swamp, it has now been brought to a high state of cultivation. Many battles have been fought here, both in ancient and modern times, including those which ended in Lord Allenby's victories over the Turks in 1918.

Esdras, The Books of. There is considerable confusion as to the nomenclature of the various B. of E. According to the A.V., the 1st and 2nd B. of E. appear among the apocryphal books. According to the Septuagint Version, the 1st B. of E. appears as E. A, while under the heading E. B. appear the canonical books of Ezra and Nehemiah. Through the influence of Jerome, this arrangement was not followed in the Vulgate. Here the B. of Ezra is styled E. I.; E. II is the B. of Nehemiah, while E. I and II are re-named E. III and IV. These 2 books are relegated to the appendix of the Catholic Bible as uninspired and entirely apocryphal. The date of E. I is probably the 2nd cent. BC. It is a compilation consisting of: (1) Trans. of part of Ezra, (2) part of Nehemiah, (3) part of Chronicles, and (4) an original portion giving the discussion of Darius and the 3 young men. The trans. is free and in superior Gk to

that of E. B in the Septuagint. The 2nd B. of E., the most pathetic of the Jewish apocalypses, dates from the last years of the 1st cent. AD. It contains 16 chapters, of which ch. i., ii., xv., xvi. are later additions, the first 2 chapters certainly being by a Christian author. The rest of the book tells of 7 visions shown to the prophet Ezra, the whole being in the extreme pessimistic tone of the school of Shammal. It is not yet settled in what language E. II was originally written. It now survives only in versions in Lat., Syriac, Ethiopic, etc. See C. Torrey, *Ezra Studies*. 1910.

Esfahan, see ISFAHAN.

Esh, tn and par., Durham, England, situated on a height 4 m. WNW. of that city. Nearby is the Rom. Catholic college and seminary of St Cuthbert, Ushaw (q.v.). E. colliery is in the vicinity. Pop. (par.) 7140 (1954).

Esher, Reginald Baliol Brett, 2nd Viscount (1852-1930). In 1903 he became chairman of the War Office Reconstitution Commission. He acquired some distinction as a writer, having pub. *Footprints of Statesmen*, 1892, *The Correspondence of Queen Victoria*, 1907, and *The Tragedy of Lord Kitchener*, 1921.

Esher, William Baliol Brett, Viscount (1815-99), lawyer, b. London, son of the Rev. Joseph B. of Chelsea. Educ. at Westminster and Cains College, Cambridge; called to the Bar, 1840; Q.C., 1861. In the House of Commons he was prominent in promoting bills relating to the administration of law and justice. As a justice of the court of common pleas he provoked criticism for some of his sentences in strike cases. On the reconstruction of the court of appeal he was made a lord justice. He succeeded Jessel as master of the rolls (1883). And retired from the bench in 1897, when he was created a viscount. The Solicitors Act of 1888, which enhanced the powers of the Incorporated Law Society owed much to E.'s influence.

Esher, vil. and urb. dist. in the co. of Surrey, England, about 15 m. SW. of London. A 300-year-old clock is keeping good time in the church. To the east of the vil. is Claremont, built by Clive of India. It was purchased in 1816 for the Princess Charlotte on her marriage with Prince Leopold of Saxe-Coburg, and she d. there on 6 Nov. 1817. Louis Philippe, the exiled Fr. king, d. there in 1850, and his queen in 1866. Claremont Woods were recently acquired for the public by the National Trust, on whose behalf they are managed by E. Urb. Dist. Council, and are open from early morning to dusk, according to season. Cardinal Wolsey lived in a mansion here, of which the gateway remains. Sandown Park race course adjoins the station. Pop. (Ward) 4740; (Urb. Dist.) 51,610 (1953).

Eshowe, small tn of Natal, South Africa, situated about 30 m. NE. of the estuary of the R. Tugela, overlooking the Indian Ocean; unofficial cap. of Zululand (q.v.). Pop.: whites, 1376; Bantu, 1793; others, 437.

Esk, name of numerous Scottish and Eng. rivs. Among the chief are: (1) The

N. Esk flowing through Kincardineshire and Angus, Scotland, rising near Edzell, and flowing into the North Sea, 4 m. from Montrose; length about 30 m. (2) S. Esk, rising in the Grampians, flowing through Strathmore to Montrose harbour, with Brechin and Montrose on its banks; length about 50 m. (3) A riv. of Dumfriesshire, formed by the confluence of the Black and the White E. in Eskdalemuir, flowing 35 m. to the Solway Firth, near Sarkfoot. (4) Two small streams, N. and S. Esk, rising in Peeblesshire, and flowing through Midlothian. They unite at Dalkeith, flowing into the Firth of Forth at Musselburgh. The N. branch passes Roslin Castle, Hawthornden, Habbie's Howe, Melville Castle; the S. branch, Dalhousie Castle and Newbattle Abbey.

Eskdale, valley of the Cumberland Esk, England, which rises between Scafell Pikes and Bowfell, forms the Esk Falls at Throthegarth, turns W. at Butterillet below Hardknott Castle (Rom. fort), and flows between Muncaster Fell and Birkby Fell to Ravenglass. From Ravenglass a narrow-gauge railway runs up the valley to Dalegarth. Part (586 ac.) of the valley is owned by the National Trust and part (827 ac.) is protected against afforestation or other development.

Eskdalemuir, par. of Dumfriesshire, Scotland, about 12 m. from Langholm. There is a National Magnetic Observatory to replace the one which was formerly at Kew. Sheep farming and forestry are carried on. Pop. about 400.

Esker, geological and geographical term applied to certain deposits formed by streams running below glaciers. These subglacial streams run in tunnels at the base of the ice, and being totally confined can cross undulating surfaces provided a sufficient head of water is present. The clays, sands, and gravels deposited by such streams form long sinuous mounds which may extend for sev. m. These Es may remain when the ice retreats to form ridges which cross the irregularities of the countryside as did the streams which laid them down. Es have been used as a foundation for roads and railways, for they often provide a convenient way of crossing hollows left in once glaciated country. (See also GLACIERS and GLACIAL PERIOD.)

Esaki-Dzhumaya, see TARGOVISHTA.

Esaki Zagra, or **Esaki Sagra**, see STARA-ZAGORA.

Eskestuna, tn in Sweden, 57 m. W. of Stockholm. Sometimes called the Sheffield of Sweden on account of its iron, steel, and copper works. Pop. 57,108.

Eskimo, or **Eskimaun Indians** (commonly called **Eskimos** or **Uquemonds**), race dwelling on the N. coasts of America, from Labrador to Mt St Elias, and also occupying Baffin Land and the shores of Greenland. They are known as Inuits (a word signifying 'man') in their own tongue; the word 'E.' being said to be a term of reproach meaning 'eaters of raw meat,' applied to them by some Indian neighbours, the Algonquins, living S. of them. The E. are a race of the yellow type, but of a lighter colour than the Algonquins and

rather smaller in stature. Their sustenance is chiefly derived from the capture of seals, which are their staple food and very valuable to them in numerous other ways, supplying them with dog-food, boots, clothing, tents, light, heat, and harpoon lines. They also procure food by pursuing the chase on land and by fishing. The *kayak*, a small slim boat for 1 man, is their most interesting and best-known invention for hunting. Its framework is covered with skin, and, with the waterproof



New York Times Photos

ESKIMO WOMEN

jacket worn by the man, it completely protects him from the waves, so that even if he capsizes he is able to rise unhurt by means of his paddle. The dog-sledge is in use everywhere amongst the E., except by those in SW. Greenland, and the E. dog is admirably adapted for use in sledge transport, being strong and powerful. The E. are a cheerful and generous race, and are friendly and hospitable to strangers. Their pastimes are athletic sports and dramatic entertainments, and their children mimic the elders on a small scale. Their dwellings are of 2 kinds, tents for summer and houses, huts, or igloos for winter. The tents are generally made of sealskin; but the winter dwellings are usually built of stone, covered with moss and banked up with snow, the entrance consisting of a long passage, only high enough to admit a man crawling on hands and knees; indeed, in some parts, N. Alaska,

for example, the huts are half underground. Some of these winter dwellings shelter as many as 40 or 50 persons. The E. men and women are clad alike in trousers of seal or deer skin, according to the season, and in a loose-fitting shirt, surmounted by a hood, which is enlarged for women and children. The E. are very ingenious in their manufactures, and during the long winter days indoors the men make carvings of walrus ivory, horn, stone, and wood, for use as well as ornament. The women spend most of their time in making the clothing and tents. As to the religion of the E., he believes all things to be ensouled, and innumerable spirits to abound everywhere. The E. pop. of Canada is about 9000, that of Alaska 15,576. Although most E. still live the life pictured above, many of them have been influenced by the presence of new air bases, radar stations, laboratories, etc., erected in N. Greenland, Alaska, and Canada. They often hunt or trade with their own motor schooners and are skilled mechanics. The Dan. and Canadian govts. try to preserve the life, culture, and self-sufficiency of the E. by moving them to better hunting grounds, even, as at Thule (q.v.), by moving a whole vil. away from the air base, but in most of Greenland (q.v.) a mixed race has arisen adapted to modern ways of life, and existing chiefly by cod fishing. See F. Nansen, *Eskimo Life*, 1893; V. Stefansson, *My Life with the Eskimos*, 1913; K. Birket-Smith, *The Eskimo*, 1936; R. Finnie, *Canada Moves North*, 1942, 1948; A. Gilberg, *Eskimo Doctor*, 1947; R. Harrington, *The Face of the Arctic*, 1954; H. Ingstad, *Nunamut*, 1954; J. Malaurie, *Les Derniers Rois de Thulé*, 1955. See also AMERICAN INDIANS; GREENLAND; RASMUSSEN, K. J. V.; THULE.

Eskimo Dog, sledge-D. used in the Arctic regions. It is broad-chested, with a stout, thick neck, erect ears, and long, sharp muzzle, not unlike the grey wolf of the prairie. It is only half domesticated, and does not bark, but howls like a wolf. E. D.s have a great deal of staying power; they are rarely fed by their E. masters, which perhaps accounts for their sharp

There are 2 breeds.

the wolf-like Ostiaks and the Samoyeds (q.v.).

Eskisehir, tn in Asiatic Turkey. It has celebrated warm springs and valuable deposits of meerschaum in its immediate vicinity, pipes of the material being manuf. in the tn. The Greeks were defeated here by the Turkish Nationalists in April 1921. The Muslims were defeated near here by Godfrey de Bouillon in 1097. Pop. 122,755; (lt) 324,614.

Esmeraldas, tn in NW. Ecuador, bordering on Colombia on the riv. of the same name, and cap. of the prov. of E. (area 5800 sq. m.). The name is derived from the old emerald mines in the vicinity. Vessels anchor outside the bar (depth, high tide, 10 ft) and load and discharge by means of launches. E. is the centre of a rich agric. dist., and the H.Q. for a number of merchants and mining

companies. Straw hats are manuf. and gold is mined. There is a customs house and an airfield. Pop. (prov.) 89,300; (tn) 16,000.

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Esof, see **AKSOVUS**.

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Esperanto, most famous international auxiliary language; it was invented by Dr L. L. Zamenhof, an oculist of Warsaw. Its first grammar was pub. in 1887 under the pseudonym *Doktor E.* (i.e. 'Hopeful'), hence the name of his language. The 1st jour. in the language, *La Esperantisto*, which was issued in 1889 from a press in Nuremberg, was suppressed, as the Russian Gov. forbade its entry into Russia on the ground that the jour. contained contributions by Tolstoy. The language, which in 1895 had spread to France, began an era of rapid progress from the 1st international congress, held in Boulogne in 1905. In construction, E. differs fundamentally from its predecessor, Volapük. Every word, before incorporated into Volapük, underwent a process of mutilation, and the author (Abbé Schleyer) did not even hesitate to create words arbitrarily. ('Volapük,' e.g., is a corruption of 2 Eng. words, 'world' and 'speech'.) On the other hand, E. is based, broadly speaking, on the principle that, with a view to attaining the maximum of internationality, the vocabulary of the international language should consist of root-words which are found to be common to sev. languages of Romance and Germanic origin, due attention being paid to other factors. International words (e.g. theatre, nature, park, character, centre, form, telephone) are incorporated into the language without change, beyond conformity with the orthography. E. too, is strictly phonetic, its 28 letters representing distinct sounds, and there are no digraphs. Each part of speech has a distinct termination, e.g. nouns end in o, adjectives in a, derived adverbs in e; there is only one conjugation to the verb, which has 12 terminations; the prepositions have a clearly defined meaning, and by the aid of some 30 prefixes and suffixes the language assumes a wonderful

flexibility. The 'constitution' of E., according to its protagonists, guards the language from arbitrary or capricious changes, while at the same time allowing great latitude in adaptation of new words to the international setting. The author of E. (see the 'Declaration' of Boulogne, etc.) disclaims any rights of ownership or control of the language. This attitude is of vital importance, as it was on the question of ownership that Volapük came to grief. The evolution of E. is directed by a Linguistic Committee (of 100-120 members) and an Academy (of 18 fellows). The H.Q. of E. in England is the Brit. Esperanto Association, 140 Holland Park Avenue, W. 11. The Universala Esperanto-Asocio (with its H.Q. at Geneva) is an association founded to utilise the auxiliary language for tourist and commercial purposes. The following is the Lord's Prayer in E.: 'Patro nia, kiu estas en la ĉielo: Sankta estu Via nomo: Venu reĝeco Via: Estu volo Via, kiel en la ĉielo, tiel ankaŭ sur la tero: Panon nian ĉiutagan donu al ni hodiaŭ: Kaj pardonu al ni ŝuldojn niajn, kiel ni ankaŭ pardonas al niaj ŝuldantoj: Kaj ne konduku nin en tenton: sed liberigu nin de malbono: ĉar Via estas la regado, la forto, kaj la gloro, eterne. Amen.' E. has a considerable following and has had an experience in use which no other so-called international language has now or ever has had. The League of Nations in 1924 recommended that the States Members should grant to E. 'as a practical auxiliary language for international communication side by side with the national language in use,' the treatment and charges in force for a language *en clair* in telegraphic and wireless communications. In 1925 the International Telegraphic Union accordingly recognised E. as a plain language. Regular broadcasts have been given in E. from a number of radio stations. See IDO. See also A. Zakrzewski, *Historio de Esperanto*, 1913; A. Möbush, *Dokumentoj de Esperanto*, 1921; E. Privat, *Historio de la lingvo*, 2 vols., 1923-7; E. Drezen, *Analiza historio de Esperanto-movado*, 1931; and also P. K. Stojan, *Bibliografio de internacia lingvo*, 1929.

Esperet, Franchet d', see FRANCHET.

Espionage, the organised employment of secret agents by govs. to obtain information concerning other countries which cannot be obtained by open methods. It also includes the dissemination of false information intended to deceive other countries. As the essence of espionage is secrecy, it follows that any treatise upon the subject, purporting to give details of the inner workings of any particular current system, must be regarded with doubt. The value of secret information is immense, because it gives the receiver a definite advantage over the opposite party, and by no one is this appreciated more than by military commanders. An early example of spying is to be found in the O.T. where Moses sent men to 'spy out the land of Canaan.' One novel method of conveying information to the authority concerned is that employed by Histiaeus

when at the court of Darius, king of Persia. He was watched so minutely that he hit upon the idea of shaving his servant's head, writing a message on the head, and then, when the hair had grown again, sending him to the person concerned.

Before the First World War Germany had a well-developed secret service, and it is estimated that over 20,000 of her agents were in France in various occupations. There is always a note of picturesqueness connected with spying, mainly owing to the fact that it appeals only to the more adventurous spirits who have the dual gift of caution and boldness. Among the First World War spies Colonel T. E. Lawrence and Mata Hari will be remembered. The former was Brit. and operated in Egypt and Palestine; whilst the latter was a Javanese woman who operated in France on behalf of Germany. She was caught and executed.

In Great Britain the organisation entrusted with the security of the state is Military Intelligence No. 5 (M.I.5), part of the War Office. Its task is to stop agents of foreign powers, or even misguided Brit. subjects, from knowingly or unknowingly transmitting the secrets of Britain to any country abroad, whether that country be hostile, neutral, or even friendly. The chief function of M.I.5 is counter-espionage. Foreign agents, or terrorists, who operate in this country with a fixed plan of campaign, are usually foiled by M.I.5 sooner or later. On such occasions M.I.5 normally co-operates with the Special Branch of Scotland Yard.

Prior to the outbreak of the Second World War German secret service agents or Nazi spies were actively engaged in undermining public allegiance in most countries of the world, and securing bands of Nazi sympathisers ready to co-operate with Germany as soon as any particular country was invaded. This wholesale system of E. was, to some extent, responsible for the rapid military collapse of Poland; it was even more effective in the downfall of Norway and Holland, in both of which cases Norwegian and Dutch collaborators helped to bring about the collapse of their countries' resistance to invasion. During the invasions of all these countries the Gers. adopted the practice of dropping in parachutes soldiers, persons disguised in the uniforms of the Allies, and persons habited as civilians behind the invaded country's battle lines and even in the heart of the country itself. In international law there can be no doubt that parachutists, if not regular soldiers, should be treated as spies. Since the war there has been sensational evidence of the activities of Soviet agents all over the world, especially in U.S.A. and Canada in connection with the atom bomb. See M. Richings, *Espionage: The Secret Service of the English Crown*, 1935; J. Thompson and S. Padover, *Espionage: Secret Diplomacy, 1800-1815*, 1937; R. Hirsch, *The Soviet Spies*, 1947; I. Gouzenko, *This was my Choice*, 1948. See also FIFTH COLUMN.

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Espartero, Baldomero (1792-1879), Sp. soldier and politician, b. Granatula, La Mancha, the son of a cartwright. He fought against Napoleon, and later against the rebels in S. America. He played an important part in the Carlist wars, and as commander-in-chief concluded the treaty of Vergara in 1839, which brought the wars to an end. In 1841 he became regent, but he was driven out of Spain 2 years later by a counter-revolution. In 1854 he was recalled to save Isabel II's throne, and ruled as a virtual dictator until his retirement from public life in 1856. He was later created prince of Vergara.

Esparto Grass, *Alfa*, *Halfa*, or *Stipa tenacissima*, species of Gramineae closely allied to the feather-G., and occurs in N. Africa. It is a graceful plant often cultivated in Britain for its beauty, and is largely used in the manuf. of paper. Two other species of G., *Lygeum Spartum* and *Ampelodesma tenax*, both of which are to be found in Africa and round the Mediterranean, serve the same purpose as E. G.

Esperanto, most famous international auxiliary language; it was invented by Dr L. L. Zamenhof, an oculist of Warsaw. Its first grammar was pub. in 1887 under the pseudonym *Doktor E.* (i.e. 'Hopeful'), hence the name of his language. The 1st jour. in the language, *La Esperantisto*, which was issued in 1889 from a press in Nuremberg, was suppressed, as the Russian Gov. forbade its entry into Russia on the ground that the jour. contained contributions by Tolstoy. The language, which in 1895 had spread to France, began an era of rapid progress from the 1st international congress, held in Boulogne in 1905. In construction, E. differs fundamentally from its predecessor, Volapük. Every word, before incorporated into Volapük, underwent a process of mutilation, and the author (Abbé Schleyer) did not even hesitate to create words arbitrarily. ('Volapük,' e.g., is a corruption of 2 Eng. words, 'world' and 'speech'.) On the other hand, E. is based, broadly speaking, on the principle that, with a view to attaining the maximum of internationality, the vocabulary of the international language should consist of root-words which are found to be common to sev. languages of Romance and Germanic origin, due attention being paid to other factors. International words (e.g. theatre, nature, park, character, centre, form, telephone) are incorporated into the language without change, beyond conformity with the orthography. E., too, is strictly phonetic, its 28 letters representing distinct sounds, and there are no digraphs. Each part of speech has a distinct termination, e.g. nouns end in o, adjectives in a, derived adverbs in e; there is only one conjugation to the verb, which has 12 terminations; the prepositions have a clearly defined meaning, and by the aid of some 30 prefixes and suffixes the language assumes a wonderful

flexibility. The 'constitution' of E., according to its protagonists, guards the language from arbitrary or capricious changes, while at the same time allowing great latitude in adaptation of new words to the international setting. The author of E. (see the 'Declaration' of Boulogne, etc.) disclaims any rights of ownership or control of the language. This attitude is of vital importance, as it was on the question of ownership that Volapük came to grief. The evolution of E. is directed by a Linguistic Committee (of 100-120 members) and an Academy (of 18 fellows). The H.Q. of E. in England is the Brit. Esperanto Association, 140 Holland Park Avenue, W. 11. The Universala Esperanto-Asocio (with its H.Q. at Geneva) is an association founded to utilise the auxiliary language for tourist and commercial purposes. The following is the Lord's Prayer in E.: 'Patro nia, kiu estas en la ĉielo: Sankta estu Via nomo: Venu reĝeco Via: Kŝtu volo Via, kiel en la ĉielo, tiel ankaŭ sur la tero: Panon nian ĉiutagan donu al ni hodiaŭ: Kaj pardonu al ni ŝuldojn niajn, kiel ni ankaŭ pardonas al niaj ŝuldantoj: Kaj ne konduku nin en tenton: sed liberigu nin de malbono: ĉar Via estas la regado, la forto, kaj la gloro, eterne. Amen.' E. has a considerable following and has had an experience in use which no other so-called international language has now or ever has had. The League of Nations in 1924 recommended that the States Members should grant to E. 'as a practical auxiliary language for international communication side by side with the national language in use,' the treatment and charges in force for a language *en clair* in telegraphic and wireless communications. In 1925 the International Telegraphic Union accordingly recognised E. as a plain language. Regular broadcasts have been given in E. from a number of radio stations. See Ido. See also A. Zakrzewski, *Historis de Esperanto*, 1913; A. Möbush, *Dokumentoj de Esperanto*, 1921; E. Privat, *Historis de la lingvo*, 2 vols., 1923-7; E. Drezen, *Analiza historis de Esperanto-movado*, 1931; and also P. E. Stojan, *Bibliografio de internacia lingvo*, 1929.

Esperet, Franchet d', see FRANCHET.

Espionage, the organised employment of secret agents by govts. to obtain information concerning other countries which cannot be obtained by open methods. It also includes the dissemination of false information intended to deceive other countries. As the essence of espionage is secrecy, it follows that any treatise upon the subject, purporting to give details of the inner workings of any particular current system, must be regarded with doubt. The value of secret information is immense, because it gives the receiver a definite advantage over the opposite party, and by no one is this appreciated more than by military commanders. An early example of spying is to be found in the O.T. where Moses sent men to 'spy out the land of Canaan.' One novel method of conveying information to the authority concerned is that employed by Histiaeus

when at the court of Darius, king of Persia. He was watched so minutely that he hit upon the idea of shaving his servant's head, writing a message on the head, and then, when the hair had grown again, sending him to the person concerned.

Before the First World War Germany had a well-developed secret service, and it is estimated that over 20,000 of her agents were in France in various occupations. There is always a note of picturesqueness connected with spying, mainly owing to the fact that it appeals only to the more adventurous spirits who have the dual gift of caution and boldness. Among the First World War spies Colonel T. E. Lawrence and Mata Hari will be remembered. The former was Brit. and operated in Egypt and Palestine; whilst the latter was a Javanese woman who operated in France on behalf of Germany. She was caught and executed.

In Great Britain the organisation entrusted with the security of the state is Military Intelligence No. 5 (M.I.5), part of the War Office. Its task is to stop agents of foreign powers, or even misguided Brit. subjects, from knowingly or unknowingly transmitting the secrets of Britain to any country abroad, whether that country be hostile, neutral, or even friendly. The chief function of M.I.5 is counter-espionage. Foreign agents, or terrorists, who operate in this country with a fixed plan of campaign, are usually foiled by M.I.5 sooner or later. On such occasions M.I.5 normally co-operates with the Special Branch of Scotland Yard.

Prior to the outbreak of the Second World War German secret service agents or Nazi spies were actively engaged in undermining public allegiance in most countries of the world, and securing bands of Nazi sympathisers ready to co-operate with Germany as soon as any particular country was invaded. This wholesale system of E. was, to some extent, responsible for the rapid military collapse of Poland; it was even more effective in the downfall of Norway and Holland, in both of which cases Norwegian and Dutch collaborators helped to bring about the collapse of their countries' resistance to invasion. During the invasions of all these countries the Gers. adopted the practice of dropping in parachutes soldiers, persons disguised in the uniforms of the Allies, and persons habited as civilians behind the invaded country's battle lines and even in the heart of the country itself. In international law there can be no doubt that parachutists, if not regular soldiers, should be treated as spies. Since the war there has been sensational evidence of the activities of Soviet agents all over the world, especially in U.S.A. and Canada in connection with the atom bomb. See M. Richings, *Espionage: The Secret Service of the English Crown*, 1935; J. Thompson and S. Padover, *Espionage: Secret Diplomacy, 1500-1815*, 1937; R. Hirsch, *The Soviet Spies*, 1947; I. Gouzenko, *This was my Choice*, 1948. See also FIFTH COLUMN.

Espírito Santo, maritime state of Brazil, first occupied by the Portuguese in 1535. It is bounded N. by Bala, W. by Minas Gerais, S. by Rio de Janeiro, E. by the Atlantic. There are tropical forests on the slopes of the Serras dos Aimorés and Negra. It is swampy near the coast. Rio Doce, the chief riv., divides it into two; the Parahiba do Sul is on the S. boundary. The area is about 15,735 sq. m. The cap., Vitória (q.v.), on E. S. Bay, is the best harbour. E. S. is well watered and very fertile, and produces coffee, sugar, fruit, corn, and timber. There are iron-ore deposits in the state, which is well served by the central group of railways. There are Ger. colonists with their own schools and churches, and also many Italians. Pop. 861,000.

Espirito Santo, or **Santo**, largest is. of the New Hebrides (q.v.), 75 m. by 45 m., heavily wooded and well watered. There are a number of Brit. and Fr. settlers. Coconuts, cotton, cocoa, and maize are grown. Pop. 4000.

Espólin, Jón (1769–1836), Icelandic administrator, historian, and poet. His *Arðakur Islands* is indispensable for the student of the hist. of Iceland.

Espronceda, José de (1808–42), Sp. poet and revolutionary politician. He was early imprisoned by the gov. for his radical views (c. 1825), and banished shortly afterwards. E. wrote the historical romance, *Don Sancho Saldaña ó el Castellano de Cuellar*, 1834. Returning to Madrid, he took part in the revolutionary contests (1835–6). He was a romanticist, and Byron's influence in his writings is very marked. His best work was lyrical poetry, such as *El Diabolo Mundo*, *El Esudiante de Salamanca*, *A la Patria*, and *El Mendigo*. See J. Carcales Muñoz, *Don J. de Espronceda: su época, su vida y sus obras*, 1914; E. Pulais, *Espronceda y Lord Byron*, 1951.

Esquimalt, seaport tn of Vancouver Is., Canada, important as a naval station on the Pacific. It contains a naval yard, dry dock, arsenal, and hospital. There are a salmon cannery and a ship-building yard and an extensive harbour on the Juan de Fuca Strait. Pop. 10,174.

Esquire (Old Fr. *escuyer*, from Lat. *scutarius*, shield-bearer), originally the attendant on a knight and bearer of his shield or armour. He ranked below the knight bachelor, and his office served as the apprentice-stage of knighthood. The title was one of function, not birth, and was not hereditary. It came to be a title of honour, implying a rank between that of knight and valet. According to Coke (2 *Institutes*, 688), anyone may be called E. (usually written Esq.) who has a legal right to call himself a 'gentleman,' i.e. one who lawfully bears a coat-of-arms. The title is widely used now by courtesy for men of all ranks, and almost without discrimination. Those legally entitled to bear it include sons of peers or knights and their eldest sons, officers of the army and navy, and members of the Bar. E. has followed much the same course as the word 'gentleman.' See also SQUIRE.

Esquiros, Henri François Alphonse (c. 1812–76), Fr. poet, politician, and historian. He wrote both poems and novels of a strong socialistic tendency, and was imprisoned for his *L'évangile du peuple*, 1840. E. went to Holland and then to England, sending studies to the *Revue des deux Mondes*, afterwards known as *L'Angleterre et la vie anglaise*, 1859–70. Other works are: *Les Hirondelles*, 1834; *Charlotte Corday* (a novel), 1840; *Chants d'un prisonnier*, 1841; *Les Vierges martyres, les Vierges folles, les Vierges sages*, 1841 2; *Histoire des Montagnards*, 1847; *La Morale universelle*, 1859; *L'Émile du XIX^e Siècle*, 1870.

Essad, Ahmed Pasha (c. 1875–1920), Albanian chieftain who, during the Balkan War (1912–13), defended Scutari against the combined Montenegrin and Serb forces. The family of E., the Toptanis, came from Tirana, near Durazzo, and was of considerable wealth and power—E.'s brother, Gani, being the special friend of, and executioner to, the Sultan Abdul Hamid. When the Sultan had Gani put to death, E. became the sworn foe of the Hamidean régime. He joined the Young Turk revolution in 1908, and from then till 1912 represented Durazzo in the Turkish parliament. When Prince Wilhelm of Wied became Mpret in 1914, E. became his minister of war and of the interior and virtually ruled the country. After Wilhelm left Albania E. made himself head of the Albanian Provisional Gov., 5 Oct. 1914, and sided with the Allies in the First World War. When enemy forces drove him from Albania, he retired to Salonika. His Serbian sympathies made him unpopular with the Italians and he was not allowed to return to Albania. He was murdered in Paris by an Albanian student.

Essay (Fr. *essai*, attempt). What is now generally understood by an E. is a literary composition of moderate length on any given subject other than purely scientific. It should treat of life in general, and not of any specialised subject. It originally implied a want of finish, and Dr Johnson defined it as 'an irregular, undigested piece.' An E. is strictly rather a series of personal comments than a finished argument or conclusive examination of any matter. A number of works of antiquity, such as Cicero's *De Amicitia* (On Friendship) and *De Senectute* (On Old Age), and the moral discourses of Seneca the Younger, could quite properly be classed as E.s. As a separate form of Eng. literature, it dates from the close of the 16th cent. The name appears to have become common on the pub. of Montaigne's *Essais*, 1580. The first great name connected with the hist. of the Eng. E. is that of Bacon (1561–1626). Abraham Cowley may, however, perhaps be more truly regarded as the father of Eng. E. His E. *Of Myself* may be taken as a typical example of what such compositions should be. Other essayists of the 17th cent. were Sir Thomas Browne, Sir Wm Temple, and Dryden. The 18th cent. was the great age of E.-writing. In 1711

Joseph Addison and Richard Steele founded the *Spectator*, thus popularising the E. as a form of literature in England. The *Tatler* and the *Guardian* also contained numerous examples of typical E.s, mostly the work of Steele and Addison. Fielding's E.s appeared in the *Covent Garden Journal*, 1752; Dr Johnson's in the *Rambler*, 1750, the *Adventurer*, 1752, and the *Idler*, 1759. Other essayists of this period were Jonathan Swift and Goldsmith (in the *Bee* and the *Citizen of the World*). Such terms as review, memoir, or treatise, apply better to more exhaustive studies, such as Locke's *Essay Concerning Human Understanding*, or Burke's *Essay on the Sublime and Beautiful*, while the journalistic 'article' may be used for slighter sketches than those entitled to be called E.s. Names of the earlier period which deserve mention as writers of works closely approaching the E. in style are those of Sir Thomas More, Sir Philip Sidney, Robert Burton, Sir Thomas Overbury, Laurence Sterne, and Daniel Defoe. A great revival of the E. took place early in the 19th cent., and with this movement Charles Lamb's name is always closely connected. His *Essays of Elia* appeared in 1823, the *Last Essays of Elia* in 1833. Other essayists of note of the 19th cent. are Hazlitt, Leigh Hunt, Carlyle, Macaulay, Thackeray, Bagehot, Pater, and R. L. Stevenson. The E. in modern times has not been quite so popular. Men are less often essayists first and foremost, but poets, historians, or novelists, who write E.s occasionally in leisure hours, and who have little or no interest in the didacticism which formed such an integral part of the E.s of their predecessors. Some of the chief names are Augustine Birrell, A. C. Benson, E. V. Lucas, Andrew Lang, G. K. Chesterton, Austin Dobson, George Saintsbury, Max Beerbohm, Hilaire Belloc, A. G. Gardiner, and Robert Lynd. Pope alone of the 18th cent. conceived an E. in heroic verse. His E.s *On Criticism* and *On Men* are really treatises, but the *Moral Essays*, if in prose, might have appeared in the *Spectator*. Apart from this all E.s are understood to be prose writings. In America the chief essayists include W. Irving, R. W. Emerson, N. Hawthorne, and J. R. Lowell. In Germany, Lessing, Schlegel, and Hermann Grimm are among the best. The E. took firm root in France at a comparatively late period, the chief representatives being Montaigne, Voltaire, Rousseau, Lamartine, Cousin, Michelet, Sainte-Beuve, Gautier, Anatole France, and E. Faguet. See A. Chalmers, *British Essayists*, 1817; H. Walker, *The English Essay and Essayists*, 1915; E. Rhys, *Modern English Essays, 1870-1920*, 1922; J. B. Priestley, *Essayists, Past and Present*, 1925; B. Dobrée, *English Essayists*, 1946; M. G. Segar, *Essays from Eighteenth Century Periodicals*, 1947.

'*Essays and Reviews*.' In 1860 a remarkable vol. was pub. under this title. All the contributors, excepting one, were clergymen of the Church of England, and the book was severely censured for heterodox views by nearly all the bishops and

formally condemned by convocation in 1864. Bishop Thomson (afterwards archbishop of York) and Bishop Wilberforce replied to the *Essays and Reviews* in their works *Aids to Faith*, 1861, and *Replies to Essays and Reviews*, 1862. The vol. contained the following 7 papers: (1) 'The Education of the World'; (2) 'Bunsen's Biblical Researches'; (3) 'On the Study of the Evidences of Christianity'; (4) 'The National Church'; (5) 'The Mosaic Cosmogony'; (6) 'Tendencies of Religious Thought in England'; (7) 'The Interpretation of Scripture'.

Essag, see OSLJEK.

Essen, Hans Henrik von, Count (1755-1824), Swedish field-marshal and statesman, b. W. Gothland. He was a favourite of Gustavus III., fighting under him against the Russians (1788-90). E. was governor of Stockholm (1795), becoming grand equerry in 1800. He conducted a stubborn defence of Stralsund against the French (1807). Charles XIII sent him as ambas. to Paris, where he negotiated a peace (1810) in which Sweden regained Pomerania. See L. A. Thiers, *Histoire de l'Empire*, 1873.

Essen, Ger. city in the Land of North Rhine-Westphalia (q.v.), 18 m. NNE. of Düsseldorf (q.v.). It lies a few m. N. of the Ruhr (q.v.), and is the heart of the Ruhr industrial area. Its abbey was founded in the 8th cent., and part of the minster dates back to the 9th cent. The city is modern and well laid out, with good housing schemes. Half of its buildings were destroyed during the Second World War, but reconstruction was begun as soon as the war was over; some of the new industrial and administrative buildings are very fine. E. is the home of the great Krupp (q.v.) works; since the end of the war they have been diminished in size, and a large part of the former Krupp property is now used by other industrial undertakings. E. is an important coal-mining centre, and has metallurgical, chemical, and other industries. Pop. (1803) 3480; (1955) 681,900. During the Second World War, as a railway and communications centre of great importance to the Germans, E. was the target of deadly raids, one of the heaviest being on 25 July 1943, when 2000 tons of bombs were dropped by the R.A.F., photographic interpretation showing that the damage to Krupp's works was greater than all that wrought in the previous raids of that year, 110 buildings being hit and the Diesel engine works being totally destroyed by fire. It was equally important an objective as the home of Krupp's armament works. The heaviest air raid on E. was that of 11 March 1945, when the Allied armies were advancing into Germany. Gen. Eisenhower states that on that day a record was estab. for the load of bombs dropped on a single target in one raid when 1079 heavy bombers of the R.A.F. rained some 5000 tons on the E. rail centre (though the record was surpassed on the 12th when 1108 heavies dropped 5487 tons on Dortmund). These attacks were energetically supported by fighters and fighter-bombers

of the R.A.F. 2nd Tactical Air Force and the U.S. Tactical Air Command. The resulting chaos was such as to prove far beyond the powers of the Reichsbahn repair organisation to remedy, despite its immense efforts to keep the lines open (see *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force*, H.M.S.O. 1946). The combined effort of all these attacks was that the vast arms factories, marshalling yards, rail ways and inland docks were out of action or actually obliterated. After the Amer. armies had encircled the Ruhr (1 April 1945) the fall of E. soon followed (6 April). See K. Ribbeck, *Geschichte der Stadt Essen*, 1915; H. Spethmann (ed.), *Essen, die Stadt*, 1938. See also WESTERN FRONT IN SECOND WORLD WAR.

Essen (previously *Esschen*), tn in Belgium, 18 m. N. of Antwerp, near the Dutch border. Pop. 9300, engaged in agriculture and manuf. of sugar, wax, and tobacco.

Essence (Lat. *essentia*, from *esse*, to be): 1. In philosophy, the equivalent of *Gk ouisia*, and was originally used in the same sense as 'substance.' Later 'substance' came to be used for the undetermined substratum of a thing, E. for the qualities expressed in its definition. Locke neatly defines it by saying: 'Essence may be taken for the very being of a thing, whereby it is what it is.'

2. In pharmacy, E.s are solutions of essential oils in alcohol, and are capable of being prepared in 2 ways: (1) By adding refined spirit to the odoriferous parts of plants or to the essential oils, and distilling. (2) By adding the essential oil to the refined spirit and agitating till a uniform mixture is obtained. Thus E. of lemons is merely a solution of volatile oil in rectified spirit. The term E., however, has received a more comprehensive significance and is applied to a liquid possessing the properties of the substance of which it professes to be the E. *Quintessence* (Lat. *quinta essentia*, 5th E.), the pure E. of anything, a solution of an essential oil in alcohol. The name applies to the purest E. obtained after 5 distillations, and was originally used to denote ether.

Essendon, tn of Victoria, Australia, situated in Bourke co., on the Moonee Ponds, at a distance of 5 m. from Melbourne. Pop. 20,000.

Essenes, Jewish religious brotherhood of the time of Christ. Though it played a somewhat important part in the hist. of Jerusalem, very little is accurately known about the E. The Rom. historian, Pliny, the Jewish Josephus, and Philo the Alexandrian are the authorities who speak of them from personal knowledge. They are nowhere mentioned either in the Bible or in the Talmud, though it has been commonly held that the Nazirim referred to in the Talmud are the E. under another name. The E. were Pharisees, laying great stress on the maintenance of ceremonial purity. Ceremonial washings formed an important part of their practice,

and white garments were worn. Their food was specially prepared by the priests, and the common meal was eaten with great solemnity. Asceticism was the keynote of their system; every form of sensual enjoyment was held to be sinful. The E. were communists, mostly engaged in agriculture. The proceeds of all labour went into the common purse, from which all expenses were paid. Entrance to the order could be obtained only by a 3 years' novitiate. The E. objected to animal slaughter, and this fact prevented many of them from joining in the temple service. The sect came to an end in the 2nd cent. AD. Their connection with the origins of Christianity has not been satisfactorily worked out. The discovery of the Dead Sea Scrolls in 1947 gave rise to the question of possible E. authorship of some of these documents. See SCROLLS OF THE LAW. See G. Moore, *The Brook Kerith*, 1916.

Essential Oils, volatile O. which possess in a concentrated form the odours of the plants or vegetable substances from which they are obtained. These O. are generally contained in a special gland or cell within the plant. The E. O. are generally insoluble in water, but they dissolve in alcohol, ether, or fatty O. They contain a large proportion of carbon which causes them to ignite easily, but as a rule they leave no permanent grease spot. They possess an aromatic smell, a hot burning taste, and can be distilled, preferably in vacuum stills, at a low temp. under reduced pressure, so as to prevent decomposition or resinification of odorous components which can damage the perfume. The fractionated vacuum distillation can be employed for the separation of lightly odorous constituents (isolates) or for the elimination of impurities and of hydrocarbons (terpenes) of very weak odour, which are the main constituents of many E. O., and decrease their solubility in alcohol. A number of very costly flower O., such as jasmín, are extracted from the petals by non-odorous solvents, and isolated from the extracts by distillation in vacuum.

Essequibo, riv. of Brit. Guiana, which has its source in the Acarai Mts, about 45 m. N. of the Equator. It is a riv. of many rapids, and therefore very difficult to navigate, but the lower course for some 50 m. to Bartica is clear for large craft. The most noted falls of the E. itself are the Aretaka cataracts. There are sev. tribs., the Cuyuni with the Mazaruni, the Rupununi, and the Potaro. After flowing for a distance of 620 m. the E. enters the Atlantic, and at its mouth it measures a width of 20 m. Among the natural wonders of the region are the Kaieteur Falls (the old man's fall) on the Potaro R., 50 m. above its confluence with the E. These have a clear drop of 741 ft, or nearly 5 times the height of Niagara Falls. Owing to the difficulty of the journey, few people from other parts of the world have visited this spot, and its remoteness and seclusion greatly enhance its impressiveness. The Potaro R. here has a

width of 400 ft and it flows away amid ravines of thickly wooded sandstone cliffs. The dist. round the falls has now been proclaimed by the gov. of Brit. Guiana as the Kaieteur National Park, and hopes are entertained of making it a health resort for Brit. Guiana. The E. gives its name to one of the 3 counties (pop. 58,440, or rather less than 1 inhab. per sq. m.) into which Brit. Guiana is divided. (See BRITISH GUIANA.) The central colony of Demerara was an offshoot from E., and was estab. in 1645.

Essex, Earls of. This title was conferred in 1572 on Walter Devereux, scion of an old Herefordshire house, but had previously been held by Devereux's ancestors (the Mandevilles, Bohuns, Bouchiers) and by Thomas Cromwell. In 1139 King Stephen created Geoffrey Mandeville E. of E., and the family of Bohun was the next to bear the title, but on the death of Humphrey Bohun, 1373, it passed to Thomas of Woodstock, duke of Gloucester. In 1461 Edward IV created Henry Bouchier E. of E., but on the death of his successor the earldom became extinct, and in 1540 it was conferred on Thomas Cromwell (q.v.). The family of Parr obtained the earldom after the execution of Cromwell, but forfeited it in 1553. Thus the title was borne by 6 different families in Eng. hist. Robert, the 2nd E. of the Devereux (q.v.) creation, was E. marshal of England and one of Queen Elizabeth's favourites; and Robert, his son, the 3rd E. (q.v.), was commander-in-chief of the parl. forces in the Civil war. The earldom became extinct in 1646 at his death, but Charles II conferred the title on the Capell family in 1661 (see CAPELL, ARTHUR) and the present (8th) E. is a representative of this family.

Essex, James (1722-84), architect; b. Cambridge; son of a carpenter. He showed some skill in Gothic architecture as it was then understood, and he restored many old buildings, including Ely and Lincoln cathedrals as well as King's College Chapel and sev. colleges in Cambridge. He also designed the stone bridge at Trinity College, 1763-5; completed the Senate House, 1766-8; and rebuilt the chapel, library, and Master's Lodge at Sidney Sussex College, 1775-82.

Essex, Robert Devereux, 2nd Earl of (1566-1601), nobleman and favourite of Elizabeth I, son of Walter Devereux, 1st E. (d. 1576). He was b. in Herefordshire and educ. at Cambridge, and accompanied Leicester's expedition to Holland in 1585, where he showed great bravery in battle. E. became master of the horse (1587) and took part in Drake's expedition to Portugal (1589). In 1591 he commanded an expedition to Normandy, and the land-forces at Cadiz in 1596. E.'s charm and natural abilities soon made him a great favourite with the queen, though his marriage to Sidney's widow in 1590 had much displeased her. He became a privy councillor, 1593; E. marshal of England, 1597; and chancellor of Cambridge Univ., 1598. E. was also commander on 'the islands voyage,' an expedition to the

Azores in 1597, and its failure marked the beginning of his permanent decline in the royal favour. In 1599 he was appointed governor-general of Ireland, but after failing to put down the rebellion and returning to England contrary to orders he was accused of secretly treating with the rebel leader, Tyrone, and imprisoned, 1599-1600. After his release all his efforts to regain Elizabeth's favour were unsuccessful. E. therefore decided to compel the queen to dismiss her advisers, being convinced that the Cecils were primarily responsible for his downfall at court. Always impetuous and arrogant, he attempted to start a rebellion among the citizens of London which had never any hope of success: he was arrested, accused of high treason, and executed, Bacon, his former friend, being his prosecutor. Elizabeth is said to have agreed to the execution only with the greatest reluctance. E.'s charm and courage were insufficient compensation for his complete lack of statesmanship and disregard of tact and diplomacy in his dealings with the influential figures at court, including the queen herself, who, fond of him though she undoubtedly was, came to realise that his overweening personal ambition made him a luxury she could no longer afford. See W. B. Devereux, *Lives and Letters of the Devereux*, 1853; G. L. Strachey, *Elizabeth and Essex*, 1928; and S. B. Harrison, *The Life and Death of Robert Devereux, Earl of Essex*, 1937.

Essex, Robert Devereux, 3rd Earl of (c. 1591-1646), soldier, son of Robert (executed 1601), b. London. James I restored to him his father's rank and titles (1604). He was a boyhood friend of the prince of Wales (later Charles I), but by 1626 had joined the parl. party. E. was lieutenant-general in the army sent against the Scottish Covenanters (1639). He refused to accompany Charles in his flight from London, and became leader of the Presbyterian party. In 1642 he commanded the parliamentary army, and fought at Edgehill; captured Reading, and relieved Gloucester (1643). E. won the 1st battle of Newbury in 1643. His invasion of Cornwall (1644) proved unsuccessful, and his army capitulated at Lostwithiel, E. himself escaping in a boat. E. resigned his commission (1645) on the passing of the 'Self-denying Ordinance.'

Essex, Walter Devereux, 1st Earl of (c. 1541-76). Eng. nobleman and soldier, son of Sir Richard D. In 1569 he raised troops to suppress the N. rebellion under the E.s of Westmorland and Northumberland, and was created E. of E. in 1572 for his service. His attempts (1573-5) to subdue and colonise Ulster were not very successful, though he conducted his campaign with great cruelty. Elizabeth I recalled him in 1575, but he was reappointed earl-marshal of Ireland in 1578, and d. in Dublin.

Essex (O.E., East-Seaxe), maritime co. of SE. England, bounded by the cos. of Cambs and Suffolk on the N., on the E. by

the North Sea, on the S. by the R. Thames, and on the W. by London, Middx, and Herts. The surface is flat and marshy near the coast, but richly wooded in the SW., forming Epping Forest (5600 ac.). Among the chief rvs. are the Thames, Stour, Lee, Colne, Crouch, and Blackwater. Farming flourishes, and splendid wheat-crops are grown in the E. and N. Cereals, sugarbeet, fruit, and seeds are raised, and livestock reared. Manufs. include silk, cement, oil products, and foodstuffs. There are extensive engineering works at Dagenham, Chelmsford, and Colchester, a gov. powder-factory at Waltham Abbey, and large oil refineries at Shellhaven and Canvey. Oyster-fishing and brewing are also important. The Tilbury and Victoria and Albert Docks of the Port of London are on the S. coast of the co. Harwich is the port for Continental traffic; Chelmsford is the co. tn, and other important centres are the resort of Southend, Colchester, famous for its oysters, and the co. bors. of East and West Ham. New tns are being built at Harlow and Basildon. The abbey at Waltham is reputedly the oldest Norman building in England; founded in 1030, it was enlarged by King Harold in 1060. Area 1527 sq. m.; pop. 2,044,964. See T. Wright, *History and Topography of Essex*, 1831; A. C. Kelway's ed. of *Memorials of Old Essex*, 1908; P. Reaney, *Essex*, 1928; H. W. Tompkins, *Companion into Essex*, 1949; Clifford Bax, *Highways and Byways in Essex*, 1939; A. Mee, *Essex*, 1942; W. Addison, *Essex Heyday*, 1949; and the Victoria County History of Essex.

Essex Regiment, The, formerly the 44th and 56th R.s, which were linked in 1881 to form the present R. The 44th was raised in 1741, served in N. America under Gen. Braddock, and remained in Canada until 1765. Returned to America 1775 and served against the French also in W. Indies. Fought under Abercromby in Egypt in 1801. Joined Wellington's army in Peninsula in 1811, and captured a Fr. 'Eagle' at Salamanca; fought at Waterloo; thence in Burma and Afghanistan, Crimean and China campaigns. The 56th was raised in 1755, served at Havana in 1762, and was in the defence of Gibraltar, 1779-83. Served again in the W. Indies; then went to India (1805). Served in the Crimea and then in Egypt. Fought in S. African campaign, 1899-1902. Raised 31 battalions during First World War and served in France, Flanders, Gallipoli, Egypt, Palestine. As a unit of the famous 4th Indian Div. the R. played its part at Sidi Barrani in the first great victory won by the Brit. Army in the Second World War, and later they took part in the capture of Gen. von Arnim and his forces in N. Tunisia (1943). In the battle of Normandy (1944) the 2nd E. were part of the 45th Territorial Div. and fought in the battles for Venlo. The R. also fought on the It. front. This is one of the few R.s which bears an 'Eagle' on its colours, which commemorates that captured at Salamanca. At Oxford Point, Bermuda,

there is a quaint monument of tools, bayonets, and iron hoops erected by the men of the 56th R. (2nd Battalion, E. R.), who were isolated there during an outbreak of yellow fever many years ago. For details of recent regimental amalgamations, see REGIMENT.

Essington Port, bay of N. Australia on the N. side of Coburg peninsula. The shores of the bay are low and destitute of vegetation. The climate is unhealthy. On the W. side, 17 m. from its entrance, the Brit. settlement of Victoria was founded in 1839. It was abandoned in consequence of its insalubrity in the year 1849.

Essling, see ASPERN.

Esslingen, Ger. tn in the Land of Baden-Württemberg, 7 m. SE. of Stuttgart (q.v.), on the Neckar. It was founded in the 8th cent. There are sev. anc. churches, including the beautiful *Frauenkirche* (1321-1516), an old *Rathaus* with a Renaissance façade, and a new baroque *Rathaus*. The tn is overlooked by a fortress. There are machinery, textile, and leather industries, and a large trade in wine. Pop. 65,000.

Essonnes, former Fr. tn, now joined to Corbeil. See CORBEIL-ESSONNES.

Est, canal in the NE. of France, starting from the Meuse near Givet, and traversing the valley of the Meuse to Port-sur-Saône. It includes canalised portions of the R.s. Meuse and Moselle. The total length is 285 m.

Established Church, see ENGLAND, CHURCH OF; SCOTLAND, CHURCH OF; STATE CHURCH.

Estaires, Charles Hector Théodat, Comte d' (1729-94), Fr. adm., a native of Auvergne. In 1778 he went to help the U.S.A. against Britain, and in the following year took St Vincent and Grenada. At Hospital Hill Forts on a plateau 400 ft high adjoining St George's, the Brit. under Sir George (afterwards Lord) Macartney made a brilliant stand against the French under d'E. in July 1779. D'E.'s force of 3000 only succeeded in carrying the lines after losing 300 to a garrison which over the whole is. only numbered 500. D'E. however failed to capture St Lucia and was beaten off by a strong force landed on the is. through the advice of Rodney (1778). D'E. was, however, wounded in a subsequent engagement, and returned to France, where he was eventually put to death for supporting Marie Antoinette. See B. Edwards, *The History, Civil and Commercial, of the British Colonies in the West Indies*, 1793.

Estaires, Fr. tn in the dept of Nord, on the Lys, the scene of much fighting in the First World War. It has textile manufs. Pop. 4300.

Estância, tn of NE. Brazil, 36 m. SW. of Aracaju on the Piauí. It exports cotton and tobacco, as well as manufacturing textiles, footwear, and vegetable-oil products. Pop. 10,500.

Estate. An E. signifies that title or interest which a person has in lands, tenements, hereditaments, or other property. It is either real E., which comprises free-

hold lands, tenements, or hereditaments, and copyhold lands; or personal E., which comprises all other kinds of property or rights in or over property, including leasehold interests in lands, tenements, and hereditaments (see **ENTAIL; FEE**). This is the modern legal connotation of the term, and it signifies not the subject of ownership itself, but the proprietary interest subsisting in it. E.s are either in possession or in expectancy. E.s in expectancy are divided into E.s in remainder or reversion (see **CONTINGENT REMAINDER; REVERSION** (in law)). An E. in reversion arises either expressly, or by mere implication of law, as where a tenant in fee simple grants a life E. to another, and thereby impliedly reserves to himself the E. ownership in reversion. E.s may be enjoyed by one person only, or by more than one either severally (see **COMMON; TENANCY IN**) or jointly. E.s are also either legal or equitable. A legal E. subsists in the owner when he is in actual possession, and is also either entitled to the beneficial interest himself or holds in trust for some other person. A mortgagee by deed is the legal owner of land, the subject of the mortgage, but holds the residue of proceeds, where a sale takes place for the realisation of his debt, in trust for the mortgagor, or equitable owner. An equitable E. subsists in a person who, though not the actual and legal owner, is entitled to the beneficial interest of the property of which some other person is in possession as legal owner. E.s in popular language have come by a process of metonymy or extension to mean the actual lands and premises of a landowner of some territorial pretensions. The word was also used formerly as a synonym for status, or a man's condition in life. It is still used with a somewhat similar connotation in respect of the hierarchy of political classes, which in Great Britain are the 3 E.s of Lords Spiritual, Lords Temporal, and Commons. See **ESTATES OF THE REALM**.

Estate Duty is paid on the E.s of deceased persons. It dates from 1894. In general, E. D. is chargeable on the value of all property, whether settled or not, which passes or is deemed to pass at death. The charge to D. is not limited to property owned by the deceased but may extend to trust funds in which the deceased had a life interest and to gifts (up to £500 exempt) made within 5 years of death (1 year in the case of gifts to charity). Generally all property movable or immovable situated in the U.K. is liable to D. irrespective of domicile. Movable property abroad is subject to D. if the deceased is domiciled here. Besides gifts of under £500 there are other exemptions, such as E.s under £3000 and certain gov. securities for persons neither domiciled nor ordinarily resident here.

E. D. is payable on a graduated scale. The general rule is that all property settled or not in which the deceased had an interest is aggregated, the aggregate value determining the rate of D. If, however, the value of the deceased's own property

is not more than £10,000 it is not aggregated but treated as a separate E.

Net capital value of total estate		Rate per cent of duty
Exceeding	Not exceeding	
£	£	
—	3,000	nil
3,000	4,000	1
4,000	5,000	2
5,000	7,500	3
7,500	10,000	4
10,000	12,500	6
12,500	15,000	8
15,000	17,500	10
17,500	20,000	12
20,000	25,000	15
25,000	30,000	18
30,000	35,000	21
35,000	40,000	24
40,000	45,000	28
45,000	50,000	31
50,000	60,000	35
60,000	75,000	40
75,000	100,000	45
100,000	150,000	50
150,000	200,000	55
200,000	300,000	60
300,000	500,000	65
500,000	750,000	70
750,000	1,000,000	75
1,000,000		80

The Finance Act, 1940 (as amended by Finance Act, 1944), introduced important new principles governing the valuation of shares and debentures of companies where the deceased had a controlling interest. Broadly, valuation is now on an assets basis instead of a market value basis.

The Finance Act, 1949, consolidated the Legacy and Succession D. into E. D. and increased the rates of D. These rates were amended by the Finance Act, 1954—see accompanying table. They are reduced by 45% in the case of agric. property and certain business assets. The average annual yield for 10 years after the Second World War was £160 million.

Estate Tail, see **ENTAIL**.

Estates of the Realm, classes of men invested with political rights in a nation or state. In Great Britain the 3 E. of the R. are the Lords Spiritual (or bishops), the Lords Temporal (peers entitled to vote in the House of Lords), and the Commons. The sovereign and these 3 E. together form the corporation or body politic of the kingdom. The Commons or 3rd E. comprises not only the members of any given House of Commons but the whole of the electorate. Originally the phrase denoted the nobles, the clergy, and the commons, but the growth of parliament and the consequent elimination of the clergy as a separate political body gradually tended to stereotype the phrase in the above

narrower meaning. Analogous E. are found in most countries. The term 4th E. of the R. is applied to the Press, because of its influence in public matters.

Estaunié, (Louis-Marie-) **Edouard** (1862-1942), Fr. novelist, b. Dijon. After teaching science in Paris, he became inspector-general of telegraphs. He began novel-writing with *Un Simple*, 1891, followed in the same year by *Bonne Dame*. E. became celebrated with *L'Empreinte*, 1895, suggested by his Jesuit education. Other works, mostly psycho-analytical, and probing the mysteries of the soul, include: *L'Épave*, 1902; *La Vie Secrète*, 1908; *Les Choses Voient*, 1913; *Solitudes*, 1917; *L'Ascension de M. Baslevre*, 1921; *L'Appel de la Route*, 1923; *L'Inferme aux Mains de Lumière*; *Le Labyrinthe*, 1924;

branch furnished the leaders of the Guelphs in the 13th and 14th cents. The male It. line became extinct on the death of Hercules III, 1803. The Estensi were mostly wise and enlightened rulers, and founded the univs. of Padua and Ferrara.

Estella, Sp. tn in the prov. of Navarra, on the Ega. In the Middle Ages it was the seat of the court of Navarre (q.v.), and in 1873-6 was the H.Q. of the Carlists (q.v.). It has many fine old buildings. Pop. 7700.

Estepa (Rom. *Astapa*), Sp. mrkt tn in the prov. of Sevilla. Pop. 8000.

Estepona, Sp. tn in the prov. of Málaga, on the Mediterranean coast, with a trade in fruit and vegetables. Pop. 11,000.

Esterhazy de Galantha, name of an ant Hungarian family dating from the 13th



THE TOMB OF BEATRICE D'ESTE AND HER HUSBAND

Although this lady lived only 22 years (1475-97), she is one of the most famous members of the House of Este.

Tels qu'ils furent, 1927. He was elected member of the Academy, 1924. See life by J. Charpentier, 1932.

Estcourt, seat of magistracy for Weenen dist., Natal, South Africa, altitude 3833 ft. E. has large bacon and cheese factories. The climate is one of the finest in Natal and the scenery is charming. Stock-breeding is carried on at a large scale. Pop.: whites, 3300; Bantu, 3079; others, 479.

Este (anc't *Ateste*), It. tn, in Veneto (q.v.), 15 m. SW. of Padua (q.v.). It has picturesque ramparts, a 17th cent. cathedral, and an archaeological museum. The House of E. (q.v.), took its name from the tn. Pop. (tn) 6600; (com.) 17,500.

Este, House of, one of the most ant and famous princely families of Italy, founded by Oberto II (d. c. 1015), Margrave of Casal Maggiore. To Azzo II, his grandson, the Emperor Henry III granted E. and other It. fiefs. Azzo was created duke of Milan, and assumed the name of E. His 2 sons Welf (Guelph) IV, and Fulco I founded respectively a Ger. and an It. branch of the H. of E. The It.

cent., prominent supporters of the Hapsburgs. The most famous members of the family are: *Paul IV* (1635-1713), who became a field-marshal, fought with distinction against the Turks, and was made a prince of the empire. *Nicholas IV* (1765-1833), a great promoter of art, and the man to whom Napoleon is said to have offered the throne of Italy. *Paul Anthony* (1786-1866), diplomat, who was Austrian ambas. in London until 1842, and in 1848 became minister for foreign affairs under Batthyani.

Esters, **Etheral Salts**, or **Acidic Ethers**, are compounds formed by the replacing of the hydrogen in acids by alkyl groups; they occupy the same position in organic chem. as the metallic S. do in inorganic. They are formed by the action of an acid or acid chloride on an alcohol, and are, as a rule, pleasant, fruity-smelling liquids, non-miscible with water, which are hydrolysed on heating with alkalis, an alcohol and the S. of an acid being formed. The fats consist of the palmitic, stearic, and oleic E. of glycerin, and on boiling with soda, the sodium S. of the acid (soap) and glycerin are formed. The process is

known as 'saponification.' Many E. are used for flavouring purposes, e.g. amyl acetate (jargonelle pear), ethyl butyrate (pineapple), etc., the former also being used as a solvent for celluloid.

Estevan, tn in Saskatchewan, Canada, 130 m. SE. of Regina. It is the centre of an extensive lignite coal-field, adjacent to the oil-fields of the Williston Basin. E. has a brick and tile plant and a regional plant of the Saskatchewan Power Corporation. Pop. 5230.

Esther, Book of, tells how, in the reign of the Persian king Ahasuerus, Haman, the king's minister, intrigued for the extermination of the Jews. But Ahasuerus had just married Esther, a Jewess, though her nationality is kept secret from her husband. She and her uncle, Mordecai, make a counterplot, which is ultimately successful. Mordecai is made minister and raised to great honour; Haman is hanged on the gallows 50 cubits high, which he has prepared for Mordecai, and instead of the massacre of the Jews, a massacre of the Persians takes place by royal edict. The Book then tells of the institution of the feast of Purim to commemorate this great deliverance. The word 'pur' has been proved to be truly Babylonian for a 'lot' and the feast was already known as Mordecai's day in the 2nd cent., according to 2 Macc. xv. 37. Ahasuerus is the Gk Xerxes (486-465 bc) and Mordecai is represented as becoming minister in the 12th year of his reign, i.e. in 474 bc. The references however raise such historical difficulties that many critics regard it as a romance intended to further the observance of the feast of Purim. Others, however, believe it has a historical basis (cf. A. W. Stroane, *The Book of Esther*, 1922). The work was in much favour among the Jews. Luther, in later years, did not scruple to express the small regard in which he held the work. It is noteworthy that the name of God does not appear once. See commentaries by L. B. Paton, 1908, and G. Smith, 1930; and J. Hoschander, *The Book of Esther in the Light of History*, 1923.

Estienne, or *Etienne* (Lat. *Stephanus*), Fr. family of scholars, printers, and publishers, the founder being Henry E. (c. 1465-1520), who started a business in Paris about 1500. For a time his foreman, Simon de Colines, who married Henry's widow, took over the estab., which was afterwards managed by Henry's 2nd son Robert (1503-59). Robert came under the influence of the Reformation, and aroused the anger of the univ. of Paris by his pub. of the *Novum Testamentum*, 1522, and of the Lat. Bible, 1540. He himself wrote a *Dictionarium seu Latinae Linguae Thesaurus*, 1532, and was printer to the king for Lat., Heb., and Gk works. In all Robert printed 11 eds. of the Bible, in Lat., Hebrew, and Fr., and 12 of the N.T., in Greek, Lat., and Fr. The opposition of the theologians forced him to leave Paris for Geneva, where he pub. sev. works of Calvin. His eldest son Henry (1531-98) joined him in 1551. The latter was one of the greatest scholars

of his time and pub. 1st eds. of some 20 Gk authors and compiled *Thesaurus Graecae Linguae* (5 vols.), 1572. Robert's brothers, Francis (1502-50) and Charles (1504-64, q.v.), were also engaged in the business. See M. Mattaire, *Stephanorum Historia*, 1709; W. P. Croswell, *A View of the Early Parisian Greek Press*, 1833; A. A. Renouard, *Annales de l'imprimerie des Estienne*, 1837; and L. Clément, *Henri Estienne et son oeuvre française*, 1899.

Estienne, Charles (*Stephanus*) (1504-1564), Fr. anatomist and printer, belonged to a famous family of printers (see **ESTIENNE**, above). He graduated in medicine at Paris, 1542; 3 years later he pub. *De Dissectione Partium Corporis Humani*, begun 15 years earlier. It was the first pub. work to include illustrations of the whole external venous and nervous systems; in it he also described the valves of the veins and the central canal of the spinal cord. E. was the last important anatomist before Vesalius. He was charged with heresy and d. in prison.

Estija, see **ECIJA**.

Estivation, see **AESTIVATION**.

Estland, the most N. of the Baltic provs. (q.v.), now forming part of Estonia. The area was conquered and christianised by the Livonian Knights (1211-27) and, as a Duchy of E., ceded in 1238 to Denmark. It became Livonian again in 1346, Swedish in 1561, and Russian in 1721.

Eston, urb. dist. of Yorks, England, 4 m. SE. of Middlesbrough, comprising South Bank and Grangetown where there are iron, steel and chemical works, and ship-building yards, and Normanby which is residential. Pop. 33,500.

Estonia (Estonian *Eesti*, or *Eestimaa*), constituent rep. of the U.S.S.R., bordering on the Gulf of Finland in the N., Latvia in the S., the Baltic Sea in the W., and Lake Peipus in the E. It is largely lowland plain, partly forested, with many lakes and marshes and soft, almost maritime climate. There are large oil-shale deposits. The main industries are oil-shale extraction and processing, the electrical and engineering industries, textiles, wood processing, and food (bacon, butter). Agriculture is also important. Dairy farming and hog raising are carried on, and grain, potatoes, vegetables, and flax are grown. The chief tns are Tallinn (cap.), Tartu, Pärnu, Narva, Kohtla-Järve. For hist. see **BALTIC PROVINCES**; **BALTIC STATES**; **ESTLAND**. During the period of independence, 1918-40, Estonian industry, cut off from the Russian market, declined, while agriculture fl. (export of butter and bacon to Britain and Germany). Independent E. was first a democratic rep., but from 1934 was a dictatorship under President Pääs, the leader of the most influential Agrarian party. In 1924 a Communist uprising in Tallinn was suppressed. Area 17,400 sq. m.; pop. (1956) 1,100,000, mostly Estonians (see **FINNS**) and Russians (about 10 per cent), before the Second World War also Germans. See J. H. Jackson, *Estonia*, 1948; A. Oras, *Baltic Eclipse*, 1948; V. Raud, *Estonia*, 1953.

Estoppel, the legal term which is applied to anything which prevents a person from denying or confirming a fact on account of his own actions. The 3 kinds of E. are: (1) Those of record, which prevent either of the parties from offering any statements contrary to the recorded judgment; (2) E. by deed, which prevents a man from denying any statement made by him in a written deed; (3) E. in pais or by conduct, which includes such instances as a tenant's inability to deny his landlord's title, once the tenant is in possession.

Estovers, term applied to the supplies of wood which a tenant has the right to take for purposes of fuel or repair from the land on which he lives.

Estrays, animals which are not wild but are found wandering without an owner in any public place or on someone else's property. They become the temporary property of the lord of the manor if found within its confines; if in any other place, they become subject to the Crown. If they are not claimed within a year and a day, this proprietorship becomes permanent.

Estrout, term in Eng. law applied to a true copy of some writing, particularly a fine or amercement entered in the records of a court of law. It is also applied to recognisances when the conditions of the latter are not kept. Under these circumstances only are recognisances estrouted, and the parties are considered as debtors to the Crown.

Estrées, Gabrielle d' (1573-99), mistress of Henry IV of France, daughter of the Marquis Antoine d'E. She married Nicolas d'Amerval, Seigneur de Liancourt, but she divorced him on account of her infatuation for Henry to whom she bore sev. children. Henry, it is said, wished to divorce Marguerite de Valois and to marry G., but her sudden death prevented the carrying out of his plans. See life by A. Desclozeaux, 1889.

Estréla, Serra da (formerly **Estrella**), mt range of Portugal, stretching SW.-NE. for about 75 m. through the dists. of Castelo Branco and Guarda (qq.v.). Its highest peak is the Malhão da Estréla.

Extremadura, prov. of W. Portugal, containing most of Lisbon dist., the S. part of Leiria dist., and the N. part of Setúbal dist. (qq.v.). It is on the lower Tagus (q.v.), and has a long coastline on the Atlantic. Livestock, wine, fruit, olives, and cork are produced. The chief tn is Lisbon. Area 2065 sq. m.; pop. 1,595,100.

2. (Or **Extremadura**) Region in Spain comprising the provs. of Badajoz and Cáceres (qq.v.). It lies between Portugal and New Castile. In mediæval times the name 'Extremes' was applied to the Christian marches during the Moorish struggles. The raising of livestock is the main industry, and cereals, olives, and figs are grown. Some copper, silver, and lead are found. Area 16,065 sq. m.; pop. 1,394,150.

Estremoz, tn of Portugal, in Évora dist., 25 m. NE. of Évora (q.v.). It has a 13th-cent. castle, and remains of its

ancient fortifications. In the 17th cent. it was important during the wars with Spain. There are marble quarries, and manufs. of pottery and tiles. Pop. 10,000.

Estuary (Lat. *æstuarium*, from *æstus*, the tide), an inlet of the sea at the mouth of a riv. where the water of the riv. and the sea meet, and the fresh and salt are mingled. The riv. seeks an exit in the sea, and the tide flows in towards the riv., so that some E.s are subject to tidal waves of great force.

Eszek, see OSLEK.

Esztergom (Ger. **Gran**; anc. **Oster Ringun, Strigonium**), city of Hungary, in Komárom co., 22 m. NE. of Tatabánya (q.v.). It is on the Danube (q.v.), opposite the Czechoslovak tn of Parkák. Once a border fortress of the Carolingian (q.v.) empire, E. was later the seat of the Arpad (q.v.) dynasty, and here St Stephen (see STEPHEN I of Hungary) was b. and crowned king. The archbishop of E. is primate of Hungary; his cathedral (1870) is modelled on St Peter's (q.v.) in Rome, and stands on an eminence on which are also the remains of the former royal palace. The archbishop's palace has a notable art collection. The tn is a spa, and has engineering industries; there are vineyards and coal-mines in the surrounding dist. Pop. 22,000. See SZÉKESFEHÉRVÁR.

Etah, Eskimo settlement on Smith Sound, Greenland.

Etampes, Fr. tn in the dept of Seine-et-Oise, on the Seine. It is known for its many ancient churches and houses, and has a 12th cent. keep. There was considerable damage in the Second World War. The tn has a market gardening trade, and textile and metal manufs. Pop. 10,400.

Etaples, J. Lefèvre d', see FABER, JACQUES.

Etaples, Fr. fishing-port and resort in the dept of Pas-de-Calais, on the estuary of the Canche. It is believed to occupy the site of the Rom. Quantovicus. A treaty of peace was signed here in 1492 between Henry VII of England and Charles VIII of France. The fishing quarter of the tn is picturesque. The 15th cent. church was destroyed in the Second World War. Pop. 6500.

Etching, art of engraving by eating into the metal with a mordant. The so-called 'Dutch bath' (hydrochloric acid and potassium chlorate), dilute nitric acid, or a solution of perchloride of iron is the mordant commonly used. A thin layer composed of gums, waxes, and resins is spread over the metal plate to form the 'E.-ground.' One method of applying the ground is as follows. The gums, etc., are squeezed into a ball covered with silk. If the heated copper is brought into contact with the ball, the composition oozes through the silk, and as it melts may be spread over the plate with a silk pad or dabber. Usually the etcher holds the ground over a flame so as to blacken it with smoke. The object of this is to show up the lines he opens. If he wants

to transfer a design, all he need do is to cover a thin sheet of paper with chalk and then trace over the design on the paper, when it is laid upon the copper plate. When the drawing is traced through the ground with an E. needle, the plate is immersed in the acid bath, and the mordant 'bites' into the lines. After the most delicate strokes are sufficiently etched, the plate is taken out and these strokes are filled up with a stopping-out varnish, like Brunswick black. This process of immersion in the bath and stopping-out the lighter gradations is continued until the acid has bitten in sufficiently to make the blackest lines. If he likes, the etcher can proceed in a different way. At



British Museum

ETCHING OF HIS MOTHER BY
REMBRANDT, 1628

first he uses his needle to open only the darkest lines and then dips his plate into the mordant so as to get these partly bitten. He next draws in the parts which are to be a shade lighter, and allows the acid to corrode these. This process is persisted in till he comes to the lightest parts. It will be seen that the corrosion is in proportion to the depth of tone required. If a soft ground E. is required, that is one imitating the texture of a crayon drawing, tallow is mixed with the E. ground and the design is firmly traced through a sheet of paper, when the grain of the latter and the kind of pencil used will leave their mark.

History.—Albrecht Dürer (1471–1528) was a pioneer in this field and etched his 'The Cannon' upon iron. Van Dyck (1599–1641), who was 'the solitary great etcher' of the Rubens school, depended for his splendid effects on the use of the open line and vigorous, dotted work. He etched sev. heads leaving accessories to be completed by an engraver. Rembrandt (1606–69), on the other hand, who is the

perfect 'painter-etcher,' relied on close-hatching, and discovered how, by leaving ink on the surface of the copper, he could cope with the difficult task of reproducing the chiaroscuro of his paintings and ensure a rich and liquid surface tone. His E.s embrace portraits, landscapes, and religious themes, 'Christ with the Sick around Him, Receiving little Children,' being widely accepted as his masterpiece. Other and notable painter-etchers of Holland were Adriaen van Ostade (1610–85), Paul Potter (1625–54), and Nicolas Berchem (1624–83). The E.s of Jacques Callot (1592–1635) and Claude of Lorraine (1600–82) are of great interest. In the 18th cent. the It. school of E. reached its high-water mark in the delicate 'Capricci' of Giovanni Tiepolo (1693–1770), and the architectural designs of Piranesi (1720–1778). A school of satirical E. developed in England. Hogarth (1697–1764) used E. as well as line-engraving to reproduce his paintings. Thomas Rowlandson (1756–1827) etched in outline, his prints being completed by aquatint or hand colouring or both (as in his Dr Syntax illustrations). George Cruikshank (1792–1878) may well be mentioned in connection with Rowlandson, as he has won universal favour by his sympathetic interpretation of Dickens's odd characters. Early in the 19th cent. (1807–19) appeared Turner's *Liber Studiorum*, all etched by the artist himself in outline and completed in mezzotint by various engravers. Francisco Goya (1746–1828) is the finest Sp. etcher; his power to seize upon all hypocrisies and affectation is well exemplified in his 'Caprichos,' whilst his 'Desastres de la Guerra' are remarkable, if almost repulsive, expositions of the terrors of war. In the last cent. the E.s of Jean François Millet (1814–75) and of Charles Meryon (1821–68) stand out. Also notable are those of A. Legros (1837–1911), but Whistler (1834–1903) with 2 exquisite London and Venice series was unsurpassed, though his brother-in-law, Seymour Haden (1818–1910), showed equal skill. Sir D. Y. Cameron, Sir Frank Brangwyn, Walter Sickert, and Sir Muirhead Bone are distinguished etchers of more recent times. E. had an exceptional vogue in the 1920's followed by a period of disfavour. It has been practised with distinction by some modern Fr. artists, e.g. by Matisse in his illustrations to Mallarmé's *Poésies*, 1932; and by Picasso whose 'Minotaure,' 1935, is a well-known plate. *See ENGRAVING; PHOTOGRAPHY; PROCESS WORK.* *See also* P. G. Homerton, *Etching and Etchers*, 1880; Sir F. Seymour Haden, *The Art of the Painter-Etcher*, 1890–1; A. M. Hind, *History of Engraving and Etching*, 1911.

Etching of Crystals is achieved artificially by subjecting C. to the action of such solvents as caustic alkalis or acids, although rock salt often becomes etched by a natural process. This salt, being deliquescent, becomes coated, after crystallisation, with a layer of water. In course of time tiny rectangular depressions are formed all over the surface. When a

C. is immersed in some solvent 'etch figures' are formed. The crystallographer frequently uses the E. marks to assist him in his classification of a certain piece of crystal; for they are found to be closely related to its crystallographic form.

Etchmiadzin, see ECHMIADZIN.

Etéocles, son of Oedipus and Jocasta, who, with his brother Polynices, succeeded to the throne of Thebes on the flight of their father. They undertook to rule in turns, but quarrelled, and Polynices fled to the court of Adrastus for vengeance. The result was the famous campaign known as the Seven against Thebes (q.v.). In this war E. and Polynices killed each other. See *The Seven against Thebes* by Aeschylus. See also EPIGONI.

Eternal Punishment, see GEHENNA; HELL.

Etesian Winds are those which are prevalent, during summer, over the S. part of Europe. Their direction is N. across the Mediterranean Sea to N. Africa, and they seem to be caused by the rising of the heated air over the Sahara and the consequent influx of cooler air to replace it.

Etex, Antoine (1808-88), Fr. sculptor, architect, and painter, b. Paris. He studied sculpture under Dupaty and Pradier, painting at the Ingres School, and later architecture under Duban. In 1829 he won 2nd prize for sculpture at the Ecole des Beaux Arts, with his 'Hyacinthe mourant.' He also won in the same period prizes for a painting of a nude bather shown in the Lebrun Gallery, and other awards. His chief work was commissioned by the Fr. gov. for the Arc de Triomphe and the colossal groups on the rear face of the Arc. These groups represent the *Résistance* of France to the coalition of 1814, and *Paix*, 1815, but though impressive, suffer to some extent by such close juxtaposition with 'La Marseillaise,' the masterpiece of Rude, which is to be seen on the opposite side. He was the friend of Gérault on whom he wrote. Chief of his architectural works is the tomb of Napoleon I in the Invalides. His work was criticised by G. Planché as lacking in simplicity, though revealing all the secrets of the art. Pubs. include a biography, *Les Souvenirs d'un Artiste*, 1877-87. See P. E. Mangedut, Antoine Etex, 1894.

Ethyl, also called Cetyl Alcohol, for it seems to be the hydroxide of a radical called Cetyl. It is a solid, transparent, white crystalline mass, which melts at about 50° C., and is contained in spermacetti.

Ethane (C₂H₆), gas composed of hydrogen and carbon, is contained in the gas which rises from the earth. It is colourless, without smell, and will burn in air with a luminous though pale flame and is insoluble in water. E. is the second number of the paraffin series, the first being methane or marsh-gas (q.v.).

Ethelbald (fl. 716-57), king of Mercia. He succeeded to a weakened kingdom, but the death of Whtred of Kent (725) and the abdication of Ine of Sussex (726) left him supreme in S. England. In 731 Bede states that all the Eng. provs. S. of

the Humber were subject to him and one of E.'s charters (736) actually calls him *rex Britanniae*. E. appears to have ruled energetically, but his private life and treatment of the Church angered St Boniface; and he was murdered in circumstances which suggest that he was regarded as a tyrant. At his death Mercian power temporarily declined, to be re-established by his son Offa (q.v.).

Ethelbald, king of Wessex (d. 860) (q.v.). In 856 his father agreed to a division of the kingdom, E. taking Wessex, while Ethelwulf retained Kent and the SE. He married Judith, his father's widow, in 858.

Ethelbert (fl. 560-616), king of Kent. His marriage with Bertha (q.v.), daughter of Charibert, king of the Franks, led indirectly to St Augustine's mission, and by him E. was converted to Christianity in 597, and he in his turn influenced thousands of his subjects to turn Christian. He destroyed pagan temples and built churches, and also issued the first written Eng. set of laws. E. seems to have held a recognised position of overlordship over the other kings S. of the Humber during the last 30 years of his reign; but Kent's supremacy vanished at his death.

Ethelbert (d. 868), king of Wessex, 3rd son of Ethelwulf (q.v.). He succeeded his father in Kent (858) and on the death of Ethelbald he took the whole realm (860).

Etheldreda, St (c. 630-c. 679), abbess and founder of the religious house of Ely. She was married twice, her second husband being Oswy, king of Northumbria. She preferred the religious life, and neither marriage was consummated. She was also known by the name of St Audrey, the origin of the present word *tawdry*, originally applied to a cheap kind of lace purchased at St Audrey's Fair.

Ethelfleda (d. 918), Eng. princess, daughter of King Alfred, and wife of Ethelred, earldorman of Mercia. She was successful in helping her brother Edward to subdue the Danes, and on the death of her husband (911) ruled his lands alone, with the title of 'Lady of the Mercians.' She is famous for the fortress which she built to resist the Danes.

Ethelfrid, or **Ethelfrith** (d. 616), king of Northumbria, son of Ethelric and the real founder of Northumbrian power. Having succeeded in 593, he gained a great victory over the Britons of the N. at an unidentified place called Degastand in 603. He defeated the Britons at Chester between 613 and 616. In 616 he was slain in a battle against Redwald of E. Anglia.

Ethelred I (d. 871), king of the W. Saxons. He was the son of Ethelwulf and elder brother of Alfred (q.v.). It was in his reign that the Danes first attempted to make permanent settlements in England. He succeeded his brother Ethelbald in 865, and in 870 E. and Alfred defeated the Danes at Ashdown. E. was defeated at an unknown place called Merantun in 871 and d. shortly afterwards.

Ethelred II (c. 965), surnamed 'the

Unready (lacking in 'rede' or counsel), Eng. king. He succeeded his half-brother, Edward the Martyr (978). At first he tried to buy peace from the Norsemen (see DANEGELD), but in 1002 E. ordered a large-scale massacre of the Danes in England, and it was probably largely to avenge this that Sweyn of Denmark attacked England (1003 seq.). In 1013 E. was forced to flee to Normandy leaving Sweyn in possession of all England. E. returned to England on Sweyn's death (1014) but was defeated by invading Danish forces under Sweyn's son, Canute (1016), and d. shortly afterwards. E. was an unpopular ruler, capricious and vacillating; but much of his failure may be explained by the disturbed conditions prevailing at his accession.

Ethelred, St., see AELRED, ST.

Ethelwold, St. (d. 984), Eng. Benedictine monk and bishop, b. Winchester. In 955 he was elected abbot of Abingdon, and in 963 bishop of Winchester. Together with St Dunstan and St Oswald of York E. led a monastic revival, founding or reforming numerous monasteries, and replacing secular canons. His feast is on 1 Aug.

Ethelwulf (d. 858), king of Wessex and Kent, son of Egbert. He succeeded to the throne in 839, and his reign was occupied with fending off constant raids by the Danes. In 851 E. won a notable victory over them at an unidentified place called Aclea. E. was an unambitious ruler; in 855 he went on a prolonged pilgrimage to Rome and in 856 granted Wessex to his son Ethelbald (q.v.), he himself retaining Kent and the SE. until his death.

Ether, in physics, see AETHER.

Ether, **Ethyl Ether**, or as it was formerly called, **Sulphuric Ether** ($C_2H_5)_2O$. is prepared by the so-called 'continuous process,' by the action of sulphuric acid on ordinary alcohol: 9 parts of concentrated sulphuric acid and 5 parts of alcohol are heated to $140^\circ C$. in a retort, whereby ethyl hydrogen sulphate is formed ($C_2H_5.OH + H_2SO_4 = C_2H_5.HSO_4 + H_2O$). A slow stream of alcohol is then run in, which reacts with the ethyl hydrogen sulphate to form E. ($C_2H_5.HSO_4 + C_2H_5.OH = (C_2H_5)_2O + H_2SO_4$). The sulphuric acid which is regenerated reacts with more alcohol according to the first equation, and so the process may be regarded as 'continuous,' at least, until the water formed dilutes the sulphuric acid to such an extent as to render it ineffective. The crude E. which distils over is washed with caustic soda solution, the top layer containing the E. being dried over lime and redistilled. E. is a colourless, mobile, and volatile liquid, with a peculiar smell, it is lighter than water (sp. gr. 0.72) and boils at $35^\circ C$. It is somewhat soluble in water, and readily dissolves fats, resins, and oils, for which purpose it is largely used in the arts. E. is very inflammable, burning with a somewhat luminous flame, and forming an explosive mixture if its vapour is mixed with air. Chemically it is stable and not

readily reactive. Owing to its low boiling point (below blood heat) it vaporises so rapidly in the air as to produce intense cold. Use is made of this in some freezing machines, and also in producing local anaesthesia by freezing. Medicinally it is also used as a heart stimulant, in small quantities; and more generally as an anaesthetic when inhaled, for which purpose it is safer than chloroform, though it is more irritant to the mucous membranes of the bronchi and its use is therefore contraindicated in cases of affections of the lungs. Accidents have occurred owing to its great inflammability. See also ANAESTHESIA.

Ether Waves (radio), name once given to the electro-magnetic radiations known as X-rays, light, heat, and wireless W. See AETHER.

Etherage, Sir George (c. 1635-91), Brit. dramatist, was educ. at Cambridge. A man in easy circumstances, he wrote plays merely to amuse himself, in those hours that he could snatch from the pleasant diversions of a man about town. He wrote 3 comedies: *The Comical Revenge*, or *Love in a Tub*, 1664; *She Would if She Could*, 1667; and *The Man of Mode*, or *Sir Fopling Flutter*, 1676. These plays had wit, but their indecency attracted the censure of Steele, though in this respect they were no worse than those of many of his contemporaries. Shortly after the production of his last comedy he was knighted, though the reason for this honour is unknown. He was sent as minister to The Hague by Charles II., and by James II in 1685 to Ratisbon, where his private conduct was disgraceful and his diplomatic value nothing. His works were collected and ed. by A. W. Verity, 1888; and H. P. B. Brett-Smith, 1927-; his *Letter Book* was ed. by S. Rosenfeld, 1928. See lives by V. Meindl, 1901 and F. S. McCarnie, 1931.

Ethers, or **Alkyl Oxides**, class of compounds of which ordinary or Ethyl E. (q.v.) is the best known. They are related to the metallic O. in the same way as the alcohols are to the hydroxides. Their formulae may be represented by ROR^1 , where R and R^1 are 2 hydro-carbon radicals. They are prepared by the action of the A. halides on silver O., or of the A. hydrogen sulphate on the alcohol, and in other ways. Chemically the E.s are neutral, inert bodies varying from volatile liquids to waxlike solids.

Ethical Societies. At the end of the 19th cent. E. S. to promote the study and application of E. principles without theological commitment were formed, first in America and then elsewhere, mainly in Britain, Germany, and Austria. The H.Q. of the Brit. S. is The E. Union, Incorporated, 4a Inverness Place, London, W. 2. The Union publishes a monthly *Journal News and Notes* and a quarterly *The Plain View*, and initiates social research, public conferences, summer schools, lecture courses, and puba. in furtherance of its object, that is, the improvement of human relations and the quality of living on a humanist basis.

For more than 40 years the Union has been specially interested in the moral aspect of education, and its pubs. in this field have been officially recognised and used. In addition, the Union supports and promotes the formation of local groups. Presidents of the E. Union have included: J. A. Hobson, L. T. Hobhouse, Graham Wallas, Gilbert Murray, G. P. Gooch, H. N. Brailsford, and Sir Richard Gregory.

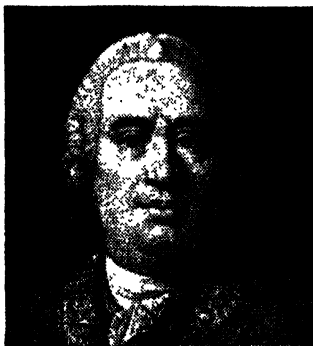
Ethics, the science which deals with human character and conduct, not considering them in the light of their own nature, but in respect of the moral judgments which have been diversely passed upon them. Like logic, therefore, it is a universal and practical science, dealing with elements common to the whole of the human race. This definition will at once show its intimate relations both with psychology and sociology. But although E. and psychology are closely related, there is a clear distinction between them which may be shortly expressed by saying that while psychology deals with the explanation and analysis of mental processes, and with the world as it is, E. concerns itself with the judgments, either condemnatory or laudatory, passed on these processes and their resultant actions, with the world, not only as it is, but also as it ought to be. An ethical bearing is therefore pre-supposed for the many psychological questions which come under discussion in E. Thus we have the question of the nature of volition itself, and the relation of will and character, which is considered substantially apart from the various acts of will which go to form it and which result from it. Character has been defined, indeed, as 'the habit of the will.' Then come the questions of Hedonism, conscience (q.v.), and the freedom of the will, and also among modern writers the question of the relation of the social life to E. E., as we have seen, deals with 2 subjects which are inseparably related: (1) Character, in relation to which it investigates the nature of duty and virtue; (2) conduct, in relation to which it attempts to differentiate between the various virtues and vices, and to discover the extent and range of obligation. Thus E. is seen to deal not only with the problems of action as they exist, but also with the more critical question of the principle or principles by which conduct should be regulated. The basis of E. is, indeed, the search for the *summum bonum*, the quest of man's highest good. It is by their varying conceptions of this highest good that the various schools are chiefly differentiated.

Thus, broadly classifying, we distinguish 2 great schools, the hedonistic and the rationalistic, to be found among both ancient and modern thinkers. The Cynics and Stoics were rationalists, that is to say, they held the life of virtue or reason to be the sought-for end, beside which nothing is to be considered. But Socrates, before this, when attempting to define virtue, had found himself compelled to do so in terms of pleasure. The chief good

must also be true felicity. Emphasis is laid on this by the hedonistic schools of Cyrenaics and Epicureans (see EPICUREANISM), where virtue is considered as leading to the highest pleasure, or, to use the Aristotelian term, *eudaimonia*, somewhat misleadingly trans. happiness by modern ethicists. With Plato and Aristotle the Socratic view is kept in its entirety and explained in a still deeper sense, and it is thus found that hedonism takes a lower place. Plato, indeed, in certain of his dialogues, explicitly condemns it. Aristotle taught that the highest good for any being is the perfect development and full exercise of its function; and since man is differentiated from the lower animals by reason, it is in the development of his moral and intellectual abilities that his end consists, the life of virtue and knowledge. The life of virtuous activity is subordinate and inferior to the life of the philosopher. It will be seen from this explanation that the Greeks treated of E. mainly from the individualistic standpoint, though the relation of E. to social science is not ignored. The scholastic philosophy, based as it was on Aristotle and his commentators, did not materially alter this view, save that in the latter the contemplation of the Deity was not explicitly propounded as man's final end and *summum bonum*. E. was brought into close union with religion, and the conception of duty was that of obedience to the commands of God. Later, however, attention was chiefly devoted to casuistry (q.v.), and instead of new theories on the subject being broached, energy was chiefly expended in the application of the principles and recognised laws to conduct under all possible variations of circumstances. E. shared, however, in the new birth of the Renaissance, and the doctrine of Utilitarianism took its rise.

Utilitarianism, called also Universal Hedonism, in contrast to the Egoistic Hedonism of the Epicurean schools, is essentially social in its attitude. We have already remarked on the development of the doctrine of pleasure by Epicurus, and this conception had not been wanting in the scholastic system, for here the consideration of reward and punishment went always side by side with the consideration of obedience and disobedience to duty, of virtue and of vice. The Utilitarian philosophers frankly took up again this view, but with them it was the pleasure of the greatest number, rather than of the individual, that was to be sought. Now, too, a definite attempt was made to estab. E. on some basis other than the theological, but the idea of rewards and punishments still survives to a large extent. Hobbes and the naturalistic school founded their E. on the natural results of human action. E. to them was the codification of the results of actions according as they finally give pleasure or pain. As this conception becomes more and more altruistic, we see that virtue becomes equivalent to utility, and so the successors of Hobbes are commonly known as the Utilitarian school. A somewhat similar view, though expressed

in the language of rationalism, was that of Cumberland, who, in his *De legibus Naturae*, 1672, gives 'the common good of all' as the final end, though he expresses 'good' in terms of perfection as well as of happiness. Many ethicists of the following period, such as Shaftesbury and Butler, make use of similar phraseology. But it was in David Hume (1711-76) that the Utilitarian school found its first capable exponent, almost, one might say, its founder. Virtue he defined as the quality which an onlooker approves, and vice as that which the onlooker blames. With this as his basis, he proceeds to examine the virtues and vices, showing that in every case that quality is approved which is useful or directly agreeable. Thus utility becomes the sole criterion of virtue.



DAVID HUME

Wm Paley, in his *Moral Philosophy*, 1785, though taking his stand on the basis of Christianity, was a notable exponent at a later period of the utilitarian principle. The period of the Fr. Revolution was one of considerable activity in this dept of thought, and here again Utilitarianism is the main principle.

Jeremy Bentham widely extended the sphere of its operation, and caused the complete reunion of E. and politics, by applying it to the latter of these. The names of Ricardo and J. S. Mill are even more important. The latter was principally occupied in the defence of his theory, rather than in its exposition, for Bentham's works had evoked a large number of attacks. All these writers regarded man as a social being, and insisted on the fact that the most necessary virtue was benevolence or unselfishness, but it was objected that no reason was ever given why the advancement of the general happiness should be the duty of the individual. Paley, as we have seen, met this objection by theological motives, while Bentham did so by regarding the community as the unit. But no truly satisfactory proof of the principle has yet been adduced. Meanwhile, though Utili-

tarianism was the more prominent, Rationalism also appeared in various forms, as interpreted by the Cambridge Platonists (q.v.), and the 18th-cent. Intuitionist school, of which Joseph Butler may be regarded as the founder. It regards conscience as the final judge of actions, but its weakness lies in the failure to give a complete definition of conscience. The ethical system of Kant, given to the world chiefly in his *Groundwork of the Metaphysics of Morals*, 1785, and the *Critique of Practical Reason*, 1788, was an attempt to clear away the many difficulties of the intuitionist system. Thus, through the transcendentalism of Germany, came into England the ethical idealism which has exercised so powerful an influence on the development of Eng. thought in every dept of philosophy during the past cent.

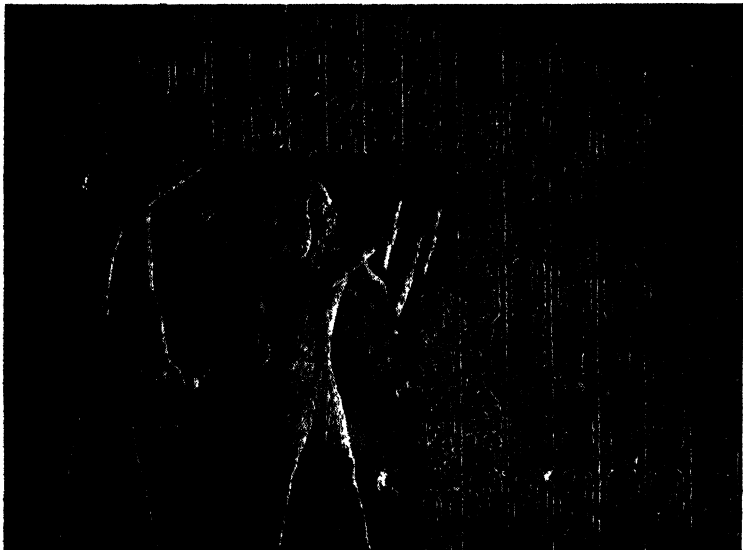
The question may be asked whether E. is the sort of subject which a professional moral philosopher can discuss in a spirit of nearly sceptical detachment. This detachment, though proper for the professional moralist in the academic exposition of E., does raise a real moral problem for him as a human being, and also as a teacher. For as a teacher he may be called upon to say something about principles on which he decides between right and wrong; he must try to say how questions of decision arise in his professional work; and ultimately he must admit that intellectual integrity is something at least partly moral in character. In order to teach E., a professional moral philosopher must care about the difference between right and wrong, between good and evil. No serious moralist can, ultimately, be satisfied with the philosopher who avers that questions concerning the meaning and end of human life signify nothing. In this context Butler in his *Dissertation on the Nature of Virtue*, raised the question of whether goodness consists simply in a general concern for human welfare. This, as he saw, was the attitude of the reforming sentimentalist. It is no doubt hard to distinguish charity from sentimentality, and it is hard for the same reason to distinguish tolerance from intellectual indifference; and even the honest intellectual is in danger of repeatedly confusing these opposites. See the works of the ethicists referred to in the text, and also H. Spencer, *The Data of Ethics*, 1879 (part 1 of *Principles of Ethics*, in 2 vols. completed 1893); T. H. Green, *Prolegomena to Ethics*, 1883; H. Sidgwick, *Outlines of the Hist. of Ethics*, 1886; C. E. Moore, *Ethics*, 1912; A. Schweitzer, *Kultur und Ethik*, 1923; A. Dyroff, *Religion and Moral*, 1925; E. Brunner, *Das Gebot und die Ordnungen*, 1932; W. Lillie, *An Introduction to Ethics*, 1948. See also COMPARATIVE ETHICS.

Ethicus, or **Aethicus**, reputed author of a cosmography, and also perhaps of a fuller, though less ambitious, work, entitled *Alia Totius Orbis Descriptio*. Internal evidence, such as the mention of the gate of St Peter in Rome, and of other signs of Christian supremacy, assigns the

cosmography to the latter part of the 4th cent. It is mentioned by Isidorus of Seville (7th cent.) and other writers, and an abridged form of the 2nd book is found in Orosius. The compendium is an abstract of ancient geographical lore, and might well have been put together from the results of the reputed survey undertaken, at the instance of Julius Caesar, by the 3 geometers, Polydektus, Zenodorus, and Theodotus.

Ethiopia (Abyssinia), independent inland country of NE. Africa (forming between 1936 and 1941 part of It. E.

almost the whole of the plateau. Most of the region was formed as the result of volcanic activity, but, save for a few hot springs, the volcanic action is now extinct. The highest peaks are found in the Simen and Gojam ranges. As the slope of the country is least steep towards the W., the majority of the rivers empty themselves in the Nile. Many, however, of lesser significance lose themselves in the sand. The Hawash is the chief river. It rises in Shoa and flows into Lake Abaya, where further trace of it disappears. This remarkable phenomenon is partly explained



W. F. Mansell

THE TABLE OF ABYDOS IN THE TEMPLE OF SETI I

Africa). It is situated between 5° N. lat. and 35° and 42° E. long. Its boundaries are, on the N. the Red Sea, on the W. the Sudan, on the S. Kenya and Uganda, and on the E. Fr. and Brit. Somaliland.

Its area is estimated at 350,000 sq. m., with an estimated pop. of 10 to 12 million. The name A. is derived from *habesh*, meaning mixed, on account of the varied nature of its peoples; but, among the inhab., the whole country used to be called E. and the term 'Abyssinian' or 'Abyssinia' is regarded as being derogatory.

E. is a vast plateau intersected by deeply running rivers, whose beds have been worn to considerable depth, and in this way is shaped masses of land have been formed called 'ambas.' A feature of these ambas is their almost perpendicular ascent, a characteristic which marks

by the great depth below sea level of the lake. Compared with smaller neighbouring lakes the Abaya is almost fresh, while salt is present in the others to such a degree that it deposits a crust round the edges. The Hawash R. is to be used for a hydro-electric scheme (1957). The R. Abai, which forms the Upper Blue Nile, reaches that river through Lake Tana. The Takazze joins the Nile, changing its name, on nearing the confluence, to that of Atbara. The Moreb flows into Nubia, but disappears later in the sand. Of all the physical features of E. the Lake Tana is the most arresting. It is 60 m. long and presents a most striking picture. A new lake, some 9000 ft above sea-level, in the crater of an extinct volcano, was discovered in 1931 by Amer. surveying engineers and named Lake Southard in honour of a former Amer. minister to Addis Ababa.

Generally speaking, the climate of E. is temperate and fairly salubrious, owing to the practically uniform elevation, though in some parts a very wide range of temp. is covered during the day. The weather conditions may be divided into 3 periods: the cold season, from Oct. to Feb.; the hot, dry season till June; and the rainy season for the rest of the year. Rain is an important factor in E., as the Nile depends for its flood entirely upon its Ethiopian tribs. The climate is conducive to the luxuriant growth of the following trees: date-palm, mimosa, giant sycamore, gum (in many varieties), pine, fig, orange, pomegranate, peach, apricot, and banana. Among the smaller plants, cotton, indigo, and the sugar-cane grow in profusion. In the Kaffa country coffee is indigenous, and it is believed to take its name from that region. The production of mead, a popular drink in E., is dependent upon a regular supply of honey, a fact which gives bee cultivation much impetus. Ethiopian crops suffer considerably from swarms of locusts which visit the country periodically.

After incorporation of E. within the It. Colonial Empire, It. E. Africa was divided into the following separate provs., each of which included a part of E.: Eritrea, which extended to Danakil; Amhara (cap. Gondar), which comprised Amhara, Gojam, and a part of Shoa; Galla and Sidama (cap. Jimma), which included the W. part of E. as far as the Sudan; Harar (cap. Harar), which includes the Muslim pop. of Harar, Arussi, and Bali. In 1938 a royal decree estab. the new Gov. of Shoa, but in 1941 the Ethiopian Gov. returned to Addis Ababa. Prior to the It. conquest in 1936 the political divs. of E. comprised a number of provs. and dependent states. The former included Tigré in the N.E., Amhara in the centre, Gojam enclosed in a great sweep of the Abai, and Shoa on the E. of the Abai; while among the many dependent states were the Wallegas, Harar, Kaffa, Gallaland, and Central Somaliland. After the It. annexation had removed the Ethiopian throne as an object of the ambition of the rival chiefs, an increasing measure of Ethiopian unity, hitherto rendered impossible by the relationship between the emperor and the great chiefs, might have been expected in course of time. The emperor was restored by the Brit. Periods of incessant warfare, and the frequent exhaustion of natural products, account for the non-existence of large tns. The cap. of E. is Addis Ababa, in Shoa; other tns are Adowa (the cap. of Tigré), Adigrat, Macalle, and Antah, in Tigré; Dire-Dawa, Debra-Derhan, Aliu-Amber, and Ankober, in Shoa; Leika in Gallaland, and Bonga in Kaffa; and Gondar, Axum, Antalo, and Harar. There are anct architectural remains at Axum, Gondar, and Ankober. Most of the transport of E. has hitherto been carried on by means of pack animals, so few of the roads are fit for wheel traffic. Many m. of macadam road were constructed in the neighbourhood of the cap. a few years ago. A railway links Addis

Ababa, via Dire-Dawa, with Jibuti (Fr. Somaliland), 488 m. away. Telegraphs and telephones connect the cap. with Harar and other places. The soil is extremely fertile. In fact Egypt owes all the richness of its own soil to the sediment brought down by Ethiopian rivs. Agriculture is followed on a large scale. In the hotter regions sugar-cane and coffee flourish; in the middle zone maize, wheat, barley, wild oranges, potatoes, and tobacco are grown, and, above 6000 ft, there are good pastures for mules, donkeys, goats, oxen, and sheep, and corn is cultivated. Horses and camels are a large part of the wealth of the people. The chief exports are coffee, civet, hides and skins, oil seeds, and wax. E. is certainly highly mineralised but no thorough geological survey has yet been carried out. Iron is found, and gold is washed in various streams; while salt, saltpetre, platinum, and sulphur are to be procured. Commercially, E. remained for a long time in a backward state, and not until the 20th cent., under the enlightened and wisely directed energy of Menelik II, was any effort made to advance its interests. Foreign undertakings gradually obtained a footing in the country in the cultivation of coffee. The ann. value of trade is estimated at approximately £23,000,000 imports, 1954, exports approximately the same. A big trade is done with the Sudan principally in hides, coffee, and shea butter.

The former Gov. of E. was feudal in its methods of administration. The princes possessed powerful influence, and formed a council in an occasional meeting called by the emperor. Two consultative organs of gov. were set up by the Italians: the General Assembly and the Council (Consulta), of which 6 native chiefs were members. There has never been a census but the estimated pop. is 18,000,000 (1956), of whom 30 per cent are Mohammedan, 50 per cent Christians (Copts), and the remainder Pagans.

In character the Ethiopians are easy-going, largely on account of the fertility of the soil, which provides an easy subsistence. Their Christianity is of a less enlightened kind, and since their conversion in the 4th cent. they have kept their connection with the Alexandrian Church through a Coptic head bishop. The Danakil profess Mohammedanism.

In anct times E. was the classical name for a part of N.E. Africa, confined on the E. by the Red Sea, and to the N. by Egypt. The provs. of E., Kordofan, Sennaar, and Nubia roughly cover anct E. The etymology of the word is unknown, although it may well be Egyptian, but the Greeks, with their passion for derivations, referred it to 2 words, *aitchos* and *ops*, and said it meant 'swarthy faced.' Homer refers to the 'blameless Ethiopians,' whom he thought of as the men dwelling far away on the furthest borders, and tells how the gods went to their banquets. Herodotus recounts with evident delight a number of fairy tales about E., which he gathered from Egyptian priests. Thus

he divides the country E. and W. into the lands of the straight-haired and woolly-haired races, and discourses at some length on the elephant- and fish-eaters, the tortoise- and serpent-eaters, the Troglodytes ('dwellers in caves'), and the Blemmyes ('hideous men'), etc. Originally occupied by independent tribes, E. became an Egyptian prov. under the 18th dynasty, and paid tribute in negroes, ivory, gold, etc. During the 11th cent. BC E. was formed into an independent kingdom with the cap. at Napata. In 750 BC she was so strong that Egypt was obliged to acknowledge her yoke. When Egypt successfully rebelled in 660, the Ethiopians continued free till the Persian conqueror, Cambyses (q.v.), forced them in 525 to recognise his rule. The is. of Meroë, famous for the oracle of Jupiter Ammon, now became the cap. In the course of the 3rd cent. BC Ergamenes destroyed the theocratic gov. and estab. a military domination in its stead. Meroë fell before the armies of Augustus, when Queen Candace was counted among his victims. The great city of Meroë was a ruin in Nero's day, and in the 6th cent. its kingdom was supplanted by Christian Nubia. From the 1st cent. AD up to about 1000 the so-called Axumite dynasty reigned at Axum, and this was succeeded by another Christian power, that of the Zagwes. Scanty Egyptian stelae and records, and a few Ethiopic, trilingual, and Sabaeen inscriptions, are almost the only sources of earliest Ethiopian hist. Christianity was introduced about AD 330. Modern hist. begins with the kingdom of Axum. Relations with the civilised world were severed after a Mohammedan conquest of the country in the middle of the 7th cent. In AD 1000 a general massacre was carried out by Princess Judith of all the royal family. The infant king, however, was safely conveyed to Shoa. Here he was welcomed, while the rest of the country was ruled by Judith. In 1268 the country was regained by the royal house, the reigning monarch being Tekunō Amtak. Portuguese attention was directed to E. in the 15th cent. A settlement resulted, and lasted 6 years, the royal family accepting the Rom. Church. In 1634 a rising against Rom. dominance resulted in the resignation of the negus (king) in favour of his son. A state of general confusion followed, no emperor being recognised. In 1769 Michel Sohel, the king of Tigré, installed himself as Itas (prime minister) over E., after assassinating Joas, the reigning monarch. A Galla chief soon overthrew him and assumed the position of sovereign, a dignity which eventually reached his grandson, Ras Ali. In 1850 a native of Amhara named Kassal, afterwards Theodore, defeated the Ras, and marrying his daughter, proclaimed himself governor. Three years later he conquered all opposition and installed himself as negus of E. He received assistance in governing from 2 Englishmen, who were killed in a rising in 1860. His rule now developed a tyrannical character, and so severe be-

came his administration that a general rebellion spread all over the country. It was put down after much fighting. Failure to secure European aid aroused a violent antipathy to Europeans, and Brit. and foreign envoys and missionaries were imprisoned. Peaceful overtures to obtain their release proved futile, and an expedition under Napier landed in 1868. The ill success of Theodore compelled him to treat for peace. He refused personally to surrender, and committed suicide. No sooner had the Brit. left than renewed strife broke out among the various chiefs for the crown. Prince Kassal of Tigré was successful in proclaiming himself emperor, though he failed to control insubordination among the various states. Meanwhile the Egyptians had become his enemies. An engagement resulted in such terrific slaughter that the parties mutually retired, and till 1882, when the Sudan was abandoned by the Egyptians, the difficulties of demarcation proved very troublesome. The Italians in 1885 occupied Massawa, and afterwards estab. friendly relations. Four years later Negus John II d., and Menelik of Shoa became emperor. In a treaty Italy assumed control of Ethiopian affairs, the empire becoming an It. protectorate. In 1895 a rising under Menelik resulted in a heavy defeat of the Italians. Following the ratification of the treaty, European missions were dispatched, and an agreement was concluded with the Brit. With the exception of Somaliland, however, the question of frontiers was judiciously avoided. In 1899 a rebellion under Mahomed Abdullah (the 'Mad Mullah') caused co-operation with the Brit., and although little practical help was rendered, the significance cannot be disregarded of the readiness of E. to request and accept Brit. aid. In 1906 an Anglo-It.-It. alliance agreed to protect their individual interests and ters. in the event of further disturbance. (See A. B. Wylde's *Modern Abyssinia*, 1901; Bruce's *Travels*, 1804; Mountmorris's *Voyages*, 1809-11.) King Menelik d. in 1913, and was succeeded by Lij Yasu, his grandson, who, coming under Ger. influence in the First World War, was deposed by public proclamation in 1916, and Walzeru Zauditu, a daughter of Menelik, was nominated and subsequently crowned empress. At the same time Ras Tafari, a great-nephew of Menelik, was proclaimed heir to the throne, and for some time acted as regent to his aunt. In polity, the Gov. remains essentially feudal in character, but in 1919 a tentative step in the direction of Cabinet Gov. was taken. In 1923 E. became a member of the League of Nations. In 1924 a royal edict was promulgated to provide for the gradual manumission of slaves. The Empress Zauditu d. in Apr. 1930 from Lent fasting following paratyphoid. Her death ended the dual form of gov. of empress and regent, which had never been a success, especially as King Tafari, supported by the more educated elements in E., had always wanted to develop E. on modern lines. In 1927 he had been proclaimed

emperor or king of kings (*negus negusti*) and late in 1930 was proclaimed Emperor Haile Selassie I.

In 1935 Italo-Ethiopian relations began to deteriorate rapidly. It. claims to spheres of influence in E. were put forward half a cent. ago, but came to nothing after the disastrous It. defeat at Adowa (Adua) in 1896. At that time the Brit. Gov. recognised the It. zone of influence as extending virtually throughout modern E., but the treaty or accord of 1891 had been superseded by later agreements, and the whole position politically was then governed by a tripartite treaty made in 1906 between Great Britain, France, and Italy—a treaty which, in the It. view,

(chiefly relating to traffic in arms and slavery) to which her membership was indissolubly linked. (See on this *Documents relating to the Dispute between Ethiopia and Italy*, 1935, Cmd. 5044.) In the previous Dec. (1934) the undefined and contested frontier between It. Somaliland and Ogaden had led to difficulties, particularly the Wal-Wal incident, in which Brit. Somaliland was also involved. On 5 Dec. Ethiopian troops, who had been in touch with an It. frontier garrison for some days, attacked the Its., who withdrew. Later, It. reinforcements, supported by aeroplanes and tanks, repulsed the Ethiopians with severe loss. The It. Gov. sent a note of protest to Addis Ababa,



HARAR

A wood market outside the main gate

recognised certain territorial adjustments in her favour in exchange for territorial cessions to E. in the region of the Somaliland coast. But the It. defeat at Adowa, coupled with the treaty Italy concluded with E. in 1896 at Addis Ababa recognising Ethiopian independence, excluded, in the view of the other European powers concerned, the possibility of an It. sphere of influence over the whole of E., and determined the basis of the tripartite treaty of 1906. This basis remained unaltered in the view of Great Britain and France in 1935, though Italy had never really relinquished her claims. (See on this G. A. Rossi, *Diritti d'Italia Oltremare*, 1916.) E. confirmed her independence by being admitted a member of the League of Nations, and Italy was a consenting party to her admission. Italy's contention, however, was that E. was admitted to membership only on certain specified and special conditions, and that in 1935 she might be regarded as no longer possessing the status of a League member, inasmuch as she had ceased to fulfil the conditions

while the Emperor, for his part, demanded arbitration in accordance with Article 5 of an Italo-Ethiopian treaty of 2 Aug. 1928. On the refusal of the It. Gov., E. submitted the dispute to the League of Nations. On 29 Jan. a violent encounter took place between It. and Ethiopian patrols at Afdub, S. of Wal-Wal. The It. Gov. again protested and mobilised 2 divs., the one for Somaliland and the other for Eritrea. Further incidents occurred and the Ethiopian Gov., in face of the It. mobilisation, now (Mar. 1935) demanded the application of Article 15 of the League Covenant (q.v.). In May Mussolini, in the Senate, spoke of the dangers threatening Somaliland and Eritrea and declared that Italy was ready to assume 'even the supreme responsibility.' Meanwhile, Brit. public opinion, which was overwhelmingly hostile to an It. expedition against E., aroused in Italy both apprehensions and irritation. The compromise proposed by Mr Eden to Mussolini—a rectification of frontiers to the advantage of Italy, and the annexation

of Ogaden, the right to construct a railway between Somaliland and Eritrea, and the cession by Britain to Italy of a passage giving access to the sea and of the port of Zeila—was rejected by Italy as wholly inadequate (June). Later (Aug.), Italy rejected proposals put forward by France and Britain following a conference in Paris between Mr Eden, M. Laval, and Baron Aloisi. In Sept., Baron Aloisi deposited with the League Council a memorandum demanding the exclusion of E. from the League as a country barbarous, disunited, and countenancing slavery; he justified the use of force in order to reply to Ethiopian aggression and to establish civilisation in E., and refused even to discuss the memorandum with the Ethiopian delegates to the League. Mussolini was now plainly advertising his intention to invade E.—a move which had been obvious since the grand It. manoeuvres on the Upper Adige in the previous month. Whether Britain and France would have been able and justified in preventing by force this aggressive move by Italy must be left to the verdict of hist., but at the time it was generally believed in those countries that neither was sufficiently prepared to risk a major war in Europe, and this in spite of the threat by Italy to Brit. interests in the Mediterranean. Meanwhile a committee of the League was strenuously working to find some solution acceptable to Mussolini. One plan, involving an international police force to organise E., and territorial rectifications in favour of Italy, was accepted by Haile Selassie but rejected by Italy, which was again demanding that E. should be deprived of its domination over various subject peoples which were living on the frontiers of the empire 'under inhuman conditions.' On 2 Oct., the It. troops in E. Africa crossed the Ethiopian frontier and hostilities had begun. The council of the League declared Italy to be the aggressor and this imposed on each Member State of the League the obligation to apply the sanctions laid down in Article 16. (Austria and Hungary refused to join in the sanctions.) Italy protested against the economic and financial sanctions and decided to resort to counter-sanctions (Nov.). Later (Dec.) came the eleventh-hour effort by Sir Samuel Hoare and M. Laval to avert the war. The Hoare-Laval pact was a plan by which Italy was to receive Tigré without Axum, and the country of the Danakil and Ogaden, while E. was to obtain an outlet to the sea; and a zone for economic expansion and settlement was offered to Italy to the N. of Kenya. The Council of the League and Mussolini alike rejected the plan. The military operations which had begun on 3 Oct. on the Tigré front had in a week, almost without fighting, estab. 3 It. corps on the positions Axum-Adowa-Adigrat. By early Nov. the Italians had reached Makale and the Takazze Riv. After 15 Dec. partial Ethiopian offensives took place, causing the It. troops to fall back on Axum and Adowa. By the end of 1935 the It. front passed through Selaklaka-

Axum-Abbis Addi-Makale. But before that Gen. de Bono had been superseded by Marshal Badoglio, Mussolini being dissatisfied with the slow progress made by the former in the N. Badoglio pursued the campaign in the N. with redoubled vigour, having learned from the fighting at Tombien (20-26 Jan.) that the only way to meet the superior Ethiopian mobility was to attack on a wide front with all the modern essentials of mechanised warfare, including bombing from the air. Graziani's advance in the S. was hampered by the difficulty of bringing up supplies. Demoralisation set in by the end of April, and many Ethiopians returned to their agric. pursuits regardless of the campaign, while a great many deserted. Before the end of May the emperor, Haile Selassie, fled from his cap. to Jibuti, embarking for Palestine, where he sought Brit. protection, and the It. Gov. announced that it had annexed E. (The full details of the Italo-Abyssinian War will be found under ITALO-ABYSSINIAN WAR, 1935-36.) In this manner the only independent state of the African continent, apart from Egypt and Liberia, lost its sovereign status, though, by the prowess of allied arms, it was destined to be restored 5 years later. E. was consolidated with Eritrea and It. Somaliland into the colony of It. E. Africa. The annexation was recognised by the W. European powers a year later; but the Brit. Gov. only recognised It. sovereignty over E. in 1938. The Italians did not make substantial progress either in the development of the country or in its colonisation, though it was proposed to spend a large sum on rebuilding Addis Ababa and in opening up roads. Military roads were constructed, but the Italians probably never achieved much actual control outside the garrisons and air communications. For the conquest of E. by the Brit. forces in the Second World War, see ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGN IN (1941).

In recent years the trade of E. has fl. phenomenally, owing primarily to the exceptionally high price of coffee (1956) on the world mkt. The currency is the Ethiopian dollar linked with the U.S.A. dollar, and the currency of the country and its economy are admitted by world experts to be sound. The budget is balanced without difficulty and its foreign and internal debts are negligible. There is an increasing and active interest in all forms of mineral prospecting, including oil and uranium, both of which may well exist in payable quantities. Many other natural resources are attracting increasing local and foreign interests.

A new and relatively liberal constitution was granted by the Emperor on the occasion of his Silver Jubilee in 1955; the legal system is being energetically overhauled with the aid of European advisers, and a modern penal code has been introduced. Education and public health are subjects of special interest to the Emperor and much of his personal income is devoted to these purposes. As a member of U.N., E. sent 2 battalions of the Imperial Guard

to Korea and casualties included 141 killed. Foreign investment in E. is encouraged, and repatriation of profits and in many cases protective tariffs for reasonable periods, and other safeguards to investors, are guaranteed by law. Since the establishment of the Ethiopian Airlines, 1945, there has been created an exceptionally efficient internal service radiating from Addis Ababa to more than 30 centres in the Empire.

See J. T. Holland and H. Hozior, *Record of the Exploration of Abyssinia* (2 vols.), 1870; A. B. Wyde, *Modern Abyssinia*, 1901; C. F. Rey, *Unconquered Abyssinia*, 1923; A. Hodson, *Seven Years in Southern Abyssinia*, 1927; Sir E. A. Wallis-Budge, *History of Ethiopia* (2 vols.), 1928; A. H. M. Jones and Elizabeth Monroe, *A History of Abyssinia*, 1935; C. F. Rey, *The Real Abyssinia*, 1935; R. E. Cheeseman, *Lake Tana and the Blue Nile—an Abyssinian Quest*, 1936; A. J. Toynbee, *Survey of International Affairs*, vol. 1, 1935; vol. II, 1936; Maj. Polson-Newman, *The War in Abyssinia*, 1936; Macartney and Cremona, *Italy's Foreign and Colonial Policy, 1914-1937*, 1938; D. Mathew, *Ethiopia*, 1947; M. Perham, *The Government of Ethiopia*, 1948; C. Sandford, *Ethiopia under Haile Selassie*, 1946, and *The Lion of Judah hath Prevailed*, 1955.

Ethiopian Languages are spoken in the modern state of Ethiopia and the surrounding dists. The main L. used up to the 14th cent., and which has been preserved as the L. of the E. Church and Ethiopic literature, is known as *tesana ge'ez*. The word *ge'ez*, which means 'free' or perhaps 'migration,' itself suggests that this tongue is a development of a foreign one, and namely in this case S.-Arabic. Indeed, it is generally accepted that S. Arabian colonies estab. in Ethiopia in the 2nd half of the 1st millennium BC introduced into that ter. the S. Semitic speech and script, which developed into the Ethiopic speech and script. The latter consists of 26 letters. There are 7 vowels, represented by hooks, which cannot be written without their consonants. Two dots separate adjoining words, and all the letters are written separately. No other Semitic dialect has so flexible or elaborate a syntax. It is written from left to right. In the 14th cent., after the 'reconstitution' of the 'Solomonic' dynasty in Ethiopia, Amharic (which is related to *Ge'ez*) became the main speech of Ethiopia and the official L. of the court (*tesana Negush*, 'the language of the Emperor'). In the N., however, its place is taken by 2 other related dialects, Tigré and Tigrar or Tigriña, this being nearer the ant *Ge'ez* than is Amharic.

Ethiopic Enochs, see ENOCH.

Ethmoid Bone ('sieve-like') is somewhat spongy in texture and cubical in form. It lies at the root of the nose between the 2 orbits of the eye sockets, and is one of the constituent B.s of the cranial box, the orbital plate of it being situated immediately behind the lachrymal B.

Ethnography, see ANTHROPOLOGY.

Ethnology, see ANTHROPOLOGY.

Ethyl, an alkyl, or organic radical, having the formula C_2H_5 , which can exist by itself and forms part of many compounds, such as E. alcohol, E. ether, etc., in which certain properties of the E. radicals persist.

Ethyl Acetate, see ACETIC ETHER.

Ethyl Carbinol, see PROPYL ALCOHOL.

Ethyl Chloride (C_2H_5Cl) is obtained by passing hydrogen C. into alcohol, in the presence of anhydrous zinc C., and condensing the product which passes over in a cooled receiver. E. C. is a colourless, ethereal liquid, boiling at $12^\circ C$, which is soluble in alcohol, and only sparingly so in water. It is used as a local or refrigerating anaesthetic in dentistry and minor operations, and also as a general anaesthetic in place of nitrous oxide.

Ethyl Ether, see ETHER.

Ethyl Formate, see FORMIC ETHER.

Ethyl Nitrite, see NITROUS ETHER.

Ethylamine ($C_2H_5.NH_2$), a substance resembling ammonia in its odour and many of its properties. It is best prepared in a pure state by the reduction of methyl cyanide (acetonitrile). It is also formed, along with diethylamine ($C_2H_5)_2NH$), and triethylamine ($C_2H_5)_3N$), by the action of ethyl bromide or iodide on alcoholate ammonia. E. is a colourless, volatile liquid, boiling at $18^\circ C$. It has a strong ammoniacal odour, and when in a dilute state is reminiscent of stale fish. It is very soluble in water to an alkaline solution, and with hydrochloric acid forms a salt which is deliquescent and soluble in alcohol, thus differing from the corresponding salt of ammonia.

Ethylene, or **Olefant Gas** (C_2H_4), a hydrocarbon prepared by heating alcohol with excess of sulphuric acid. A better method is to pass the vapour of ethyl alcohol over heated alumina, the latter acting as a catalyst: $C_2H_5OH \rightarrow C_2H_4 + H_2O$. It is produced also by petroleum cracking (q.v.). E. is a colourless G. with a faint ethereal odour, and is insoluble in water. It burns with a very luminous flame, forming carbon dioxide and water. Chemically, E. is an 'unsaturated' substance, uniting directly with an equal vol. of chlorine to form E. dichloride or 'Dutch liquid,' and also with bromine, hydrogen, chloride, sulphuric acid, etc. It is present in small quantities in coal-gas. E. is used to some extent as an anaesthetic, but more largely as an artificial ripening agent for oranges, grape-fruit, etc. It is also important as an 'intermediate,' i.e. a compound prepared not so much for direct use as for conversion into other compounds. 'Polythene,' an extremely useful insulating plastic, is prepared from E. by polymerisation (q.v.).

Ethylene Alcohol, see GLYCOL.

Etienne, family of Fr. printers, see ESTIENNE.

Etienne, St, see ST ÉTIENNE.

Etiolation, see BLANCHING.

Etiology, the consideration of the causes of disease. These are divided into: (1) predisposing or remote, (2) exciting or

proximate, (3) determining. The various causes act in different ways.

Etiquette, Madame, see ANNA-ELIZABETH NOAILLES.

Etiquette is derived from the O.F. *estiquette*, 'a label,' another and closer Eng. derivative being 'ticket.' The *estiquette* seems to have been a kind of card of introduction, a meaning which offers some explanation of its later sense. The behaviour dictated by good breeding, the formal ceremonies prescribed by authority as appropriate to various social, court, and other official functions, and especially the observance of the rules of precedence, and the other proprieties of rank and office, are all part of E., which may briefly be described as 'conventional decorum.' See also ADDRESS, FORMS OF.

Etive, salmon riv. and sea-loch of Argyll, Scotland. The riv. rises on the Moor of Rannoch and finally is merged in the Firth of Lorne. The loch into which it flows is some 20 m. long, and is a submerged valley noteworthy for its natural beauty.

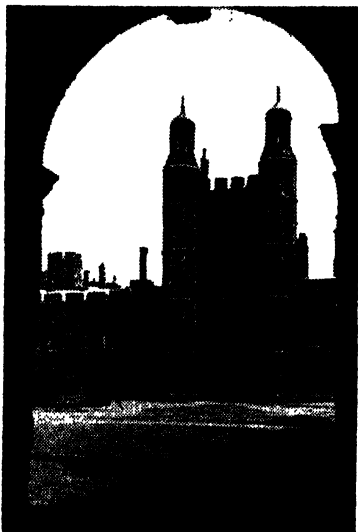
Etlar, Carit (1816-1900), pen-name of the Dan. dramatist and novelist, Johan Karl Christian Brosbøll, b. Fredericia. He studied painting for some time at the academy of Copenhagen, then took up literature, and pub. *Slægtskabet* in 1839. His works were very popular at the time, and include historical romances, tales of Dan. life, and dramas. His *Skrifter* (collected works) appeared at Copenhagen in 1859-68. Among individual works may be named *Livets Conflicter*, 1844; *Gjengjældingen*, 1853; and *Arabere og Kabylere*, 1868.

Etna, or **Monte Gibello** (from Gk *alphō*, I burn), volcano, 10,758 ft. in the prov. of Catania (q.v.), on the E. coast of Sicily. By rail the circumference of its base measures 86 m., and it is estimated to cover over 450 sq. m. In shape it is a truncated cone; it has as many as 200 craters. On the W. side the symmetry of its slope is interrupted by a deep gully, 3 m. wide, known as Valle del Bove. Strabo (q.v.) mentions the 3 distinct zones of vegetation. Most of the highest region, down to a level of 7000 ft. is barren except for some stunted Alpine shrub, and is usually covered in snow, besides scoriae and ashes. The next zone is the zone of forests, the upper part of which is covered with birch trees, whilst the lower reaches (up to 6000 ft.) are dense with evergreen pines and chestnuts. The lowest region, which extends up to about 3000 ft., has the splendid fertility natural to volcanic soil. Here olives, vines, and all kinds of vegetables flourish, and the slopes are dotted everywhere with populous cities and villas. From 476 bc there have been repeated and serious eruptions. Catania was overwhelmed by the eruption of 1169, and in 1669 a great abyss, 12 m. long, was opened up in the side of the mt.

Eton, tn on the l. b. of the Thames, opposite Windsor, in Buckinghamshire, England. Pop. 4800.

Eton College, one of the most notable of Eng. public schools, was founded in 1440 by

Henry VI under the title of 'The College of the Blessed Mary of Eton beside Windsor,' but was not immediately completed. The building of the chapel was left incomplete in 1461, as a consequence of the Wars of the Roses, and finished in 1482. The buildings of 1521 were not part of the original plan, but the school was completed in 1523. The first headmaster was Westbury, and Bishop Waynflete was the first provost. The original foundation consisted of a provost, 10 priests, 4 clerks, 6 choristers, a schoolmaster, 25 poor



John H. Stone

THE QUADRANGLE, ETON COLLEGE

scholars, and 25 infirm bedesmen, but this constitution only lasted for a very few years. Revised statutes of 1443 provided for a provost, 10 priests, 10 chaplains, 10 clerks, 16 choristers, a schoolmaster, an usher, 70 scholars, and 13 poor infirm men. (The 13 poor men are not heard of after about 1460.) New statutes of 1868 provided a provost, 11 fellows, headmaster, lower master, not more than 2 chaplains (there is now 1), and 70 scholars. The number of pupils averages 1150. The 'Oppidans,' i.e. boys not on the foundation, form the great body of students. There are about 12 vacancies a year for collegers, filled by selection. Until 1851 the education was purely classical, but in that year mathematics was re-introduced, after having been dropped from the curriculum (it was certainly taught in the 15th cent.), and physical science was added in 1869. The Gothic stone chapel is the chief architectural beauty of the

college. A new east window was made in 1951. Collegers live within the walls, but most of the boys live in masters' houses, which are built of brick and picturesquely grouped about the older buildings and quadrangles. There is a special chapel for the younger school, a museum, and a fine library with about 22,000 books, including MSS. from the 10th cent., a Gutenberg Bible, and 3 Caxtons. In 1908 King Edward VII opened the much-needed school-hall, and a domed octagonal school library in memory of the Etonians who fought in the Boer War. There are also science schools, a school of mechanics, and an observatory. Speech day is celebrated on George III's birthday, 4 June; there is an annual cricket match at Lords between the school and Harrow, and on St Andrew's Day the oppidans play the collegers at football. Both Oxford and Cambridge rely much on Etonian oarsmen in their boat races. The eccentric custom known as 'Montem' (q.v.) was abolished in 1846. In the air raids of 1941 a bomb struck the Upper School, whose panels contained hundreds of names, some very distinguished, carved on the wood, and demolished the headmaster's room adjoining. Another bomb struck Savile House in Weston's Yard, the 17th cent. house of the precentor. See W. L. Collins, *Etoniana, Ancient and Modern*, 1865; H. C. Maxwell-Lyte, *A History of Eton College, 1440-1910*, 1873, 1911; A. Clutton Brock, *Eton*, 1900; R. A. Auston-Leigh, *Guide to the Buildings of Eton College*, 1921; B. J. W. Hill, *Eton Medley*, 1948.

Étretat, Fr. seaside resort in the dept of Seine-Inférieure, known for its beautiful white cliffs. The church of Notre Dame dates from the 12th-13th cents. There are remains of a Rom. road and an aqueduct. Pop. 2000.

Etruria, name of the country of the Etruscans. E. Propria, through which the Arno flowed, lay W. of the Apennines and the Tiber; E. Campaniana lay S. of the Tiber; and E. Circumpadana embraced the valley of the Po. The famous confederation of 12 cities in E. Propria included Veii, Tarquinii, Clusium, Caere, Cortona, Volaterrae, Vulci, Volsinii, and Perusium; in the N. prov. were Felsina (Bologna), Mantua, Ravenna, and Adria, which gave its name to the Adriatic; and in the S. was Capua.

The Etruscans called themselves Rasena, whilst their Gk name was Tyrrheni. Their origin is uncertain; but they probably came from Asia Minor at some date before 800 BC, and this view is suggested by what little is known of their language. See also ALPHABET; ETRUSCAN LANGUAGE AND WRITING; EUGUBINE TABLES.

The Etruscan gov. was a close aristocracy, and was confined to the family of the Lucumones who combined civil with religious functions: the common people appear to have been in a state of serfdom. A meeting of the confederation was held annually at the temple of Voltumna near Volsinii.

E. was an empire when Rome was still

an insignificant city. Thus the Tarquin kings and the famous Lars Porsena of Clusium were probably Tuscan officials or magistrates sent to Rome in token of her subjection, and the Servian wall, the Capitoline temple, and the Cloaca Maxima still bear testimony to the reality of the Etruscan occupation. It was, moreover, to their conquerors that the Romans owed their colleges of augurs, their triumphs, their gladiatorial shows, their 12 lictors, their purple-bordered toga praetexta, their curule chair, and above all their regard and respect for women. The Etruscans attained their highest glory in the 6th cent. BC, when they figure in Gk hist. as the allies of the Carthaginians, who, in 538, expelled the Gk colonists from Corsica, and again when they (the Etruscans) were defeated in a famous naval battle against the tyrant Hiero I of Syracuse (474), and once more when they sent ships to help the Athenians during the siege of Syracuse (414). Indeed they were celebrated in ancient times, like the Phoenicians, as a great sea power. But as early as 423, when the Samnites seized the stronghold of Capua, Etruscan supremacy had begun to decline. The inroads of the Gallic hordes affected E. even more than Rome, and in 396, after a 10 years' siege, the veteran Camillus finally captured and destroyed the populous and splendid city of Veii in spite of its cyclopean walls. The S. prov. swore allegiance to Rome in 351, and, after a series of crushing defeats, the fate of the Etruscans was finally sealed by the decisive Rom. victory of Cornelius Dolabella at the Vadimonian Lake (283), when Tarquinii was obliged to put an end to her stubborn resistance. In 91 they received the Rom. franchise. The military colonies estab. in E. by Sulla and Augustus destroyed the national character of the people, and the country thus became Romanised. See D. Randall-Moyle, *The Etruscans*, 1927. See also ETRUSCAN ARCHITECTURE AND ART.

Etruria, dist. of Hanley (q.v.), in the city and co. bor. of Stoke-on-Trent. In 1769 Josiah Wedgwood and Thomas Bentley opened here their famous E. potteries; the original factory is now used for other purposes, but the fabric is preserved as an historic building. There is a memorial to Thomas Wedgwood, pioneer of photography and patron of Coleridge, in E. Park. Iron working is carried on. E. gives its name to certain beds of marls and clays in the N. Midlands, useful for pottery manuf.

Etruscan Architecture and Art, see ARCHITECTURE III.

Etruscan Language and Writing. E. was the L. spoken by the pre-Rom. pop. of Etruria (q.v.). It has come down to us in over 9000 inscriptions, which have been discovered in Etruria proper, roughly corresponding with modern Tuscany, as well as in other It. regions, such as Umbria, Campania, Emilia, Sicily, Sardinia, and so forth, or even beyond the borders of Italy, in Styria, at Carthage, and in Egypt, where the most important E. document was found. This remarkable

text, containing about 1500 words, is written on the linen wrappings of an Egyptian mummy, and belongs to the Graeco-Rom. period; it is preserved in the museum of Agram (or Zagreb), Yugoslavia. There are not many other long inscriptions extant. The most important of them are the tile from S. Maria di Capua (now in the Berlin museum), of the 5th cent. BC: about 300 words are preserved; the much more recent Perugia *cippus* contains about 120 words. The Tablet of Magliano (now in the Archaeological Museum at Florence), an inscription engraved on lead, is assigned to the 6th cent. BC. The last datable E. inscriptions belong to the early years of the Christian era.

Notwithstanding the relatively great number of inscriptions (the great majority consisting of a few words only), the many attempts to decipher the E. L. have been unsuccessful. It is certain, however, that it is neither Indo-European in structure or vocabulary, nor does it resemble any other known L., although it might have had some affinity with the anct group of the Caucasian L.s. On the other hand, the simple reading of E. inscriptions does not present great difficulties, because the E. script is fairly well known. E. W. goes, like the Semitic and early Gk and Lat. alphabets, nearly always from right to left; there arc, however, inscriptions written in *boustrophedon* style, i.e. in alternate lines from right to left and left to right.

The original E. alphabet (8th cent. BC) derived from the early Gk, and contained 26 letters (21 consonants and 5 vowels). As time went on, there were reductions and various modifications, and about 400 BC the classical E. alphabet took its final form, having 20 letters: that is 4 vowels (*a, e, i, u*, but no *o*) and 16 consonants. E. speech knew no distinction between the voiced and breathed sounds *b* and *p*, *d* and *t*, *k* and *g*; therefore, the classical E. alphabet had no *b* or *d*. At a later stage, also *k* and *g* disappeared, and the letter *C* (E. *gamma*) was employed for *g* and *k*. See also ALPHABET.

Etsch, see ADIGE.

Etterbeek, industrial E. suburb of Brussels, Belgium. Pop. 51,500.

Ettlingen, Ger. tn in the Land of Baden-Württemberg (q.v.), 37 m. NW. of Stuttgart (q.v.). It is a picturesque tn, with a castle and an anct church. Pop. 5000.

Ettmüller, Ernest Moritz Ludwig (1802-1877), Ger. philologist. His great work was his patient research into Middle, High, and Low German, and into the anct Norse literature. From 1829 to 1852 he pub. scholarly eds. of old texts, including *Beowulf*, 1840, and he also brought out a *Lexicon anglo-saxonicum*; he studied the old Norse songs from the Niebelungen saga and pub. *Lieder der Edda von den Niebelungen*, 1837.

Ettrick, 1st Baron, see NAPIER.

Ettrick: 1. Riv. which waters part of Selkirkshire, Scotland. It rises in Capel Fell (2223 ft) in the SW., and flows almost due NE. for over 30 m., receiving

the waters of the Yarrow before joining the Tweed 3 m. below Selkirk. It passes through a country full of literary associations, for the 'Ettrick Shepherd,' James Hogg, lived in the par. of E.; and Deloraine, which recalls the hero of Scott's *Lay of the Last Minstrel*, lies below the vil. of Buccleuch. E. Water, upon which E. vil. stands, is part of the riv.

2. Forest, once covered all Selkirkshire and parts of the shires of Edinburgh and Peebles. It was once a favourite hunting ground for kings, but has been pastureland since the 18th cent.

Etty, William (1787-1849), painter, was the son of a miller, b. York. After 7 years in a printer's works, he at last (1806) realised his ambition and attended the Royal Academy schools in London, having for 1 year the advantage of Sir Thomas Lawrence's tuition. 'Sappho,' 1811, which was hung at the Royal Institution, was his first success. Elected R.A., 1828, he remained a life-long student of the nude in the Academy schools and his oil studies are now highly valued. One consequence of his study of the Venetian masters during his 1t. tour of 1821 was that he became famous as a colourist, and especially for the rich glow of his draperies and for the skill with which he harmonised his backgrounds with his central figures or subjects. His masterpieces include: 'Youth on the Prow and Folly at the Helm,' 1832; 'Cleopatra's Arrival in Cilicia'; and 'The Sirens.' The Tate Gallery, the York, and other municipal galleries of Britain have examples of his work. See lives by A. Gilchrist, 1855, and W. C. Monkhouse, 1874.

Etymology (Gk *etymos*, and *logos*), an investigation into the origin and original significance of words. It forms a subsidiary part of the science of comparative philology, but has only been scientifically studied since the 19th cent. False E.s have been often suggested through ignorance and half-knowledge. Folk-E. has played an important part in the development of languages. Words that people have known from their childhood are taken for granted, but it is quite different with the new terms they meet. These arrest their interest and, believing that every word has its signification, they seek for this, guided by resemblances of sounds to words already known, thus reaching false conclusions through false analogies. Various examples of the same illogical process are found in the O.T., in the Homeric tales, in quaint E.s of medieval writers, and even in some of the present-day dictionaries. Scientific E. was made possible by the birth of philology and by the study of other languages. It no longer sought the relation between the words of a single language exclusively within itself, but extended its view to a whole group of cognate tongues, or, wider still, to a whole family. Thus a new science arose under the title of Comparative Grammar. The evidence that the group of languages known as the Aryan language form a family, i.e. are all sister-dialects of one common tongue, consists

in their grammatical forms being the same, and in their having a great many words in common. In judging whether an individual word in one of these tongues is really the same as a word in another of these tongues, one is no longer guided by similarity of sound. Words are constantly undergoing changes, and each language follows its own fashion in making these changes. Corresponding words, therefore, in the sev. languages must, in the long course of ages, have come to differ greatly; and these differences follow certain laws which it is possible to ascertain. Of the laws of interchange of sound, Grimm's Law, named after the great Ger. philologist, is the most important. It exhibits the relations found to exist between the consonant sounds in the 3 groups of the Aryan languages. Followers of this theory were Curtius and Fick. From the 19th cent. onwards Eng. E. has been soundly based on an historical and scientific approach to the development of the Eng. language, as may be seen in the dictionaries of Skeat, Murray, and Wycl.

Etzel (or **Attila**), king of the Huns, see **ATTILA**.

Eu (the Rom. **Augusta**), Fr. tn in the dept of Seine-Inferieure, on the R. Bresele, 64 m. NNE. of Rouen. The riv. is canalised between E. and Le Tréport, 2 m. away. The tn is noted for the fine Gothic church of St Laurent (12th cent.), and the château of the Orléans family, which was devastated by fire in 1902 but which has since been restored. The forest of E. is SE. of the tn. Glass and casks are manuf. Pop. 5500.

Eua, one of the is. of Tonga, lying SE. of Tongatabu. It was discovered by Tasman in 1643.

Euboea, also called **Egripos** and **Negropont**, largest is. of the Grecian archipelago, having a length of some 90 m., and a breadth varying from 4 to 30 m. Area 1380 sq. m. It lies in a direction NW. to SE., is separated from the mainland by the narrow strait Euripus, and protects the coasts of Attica, Boeotia, and S. Thessaly. In Homer the inhab. are called Abantes. In the N. of E. dwelt the Histiaei; below these were the Eilopii, and in the S. were the Dryopes. The centre of the is. was inhab. chiefly by Ionians. The promontory of Artemisium, where the Greeks gained a great victory at sea over the Persians (480 bc) forms a NE. extremity. Part of the same mt range which guards the E. of Thessaly, traverses the is. from end to end, Mt Dirphys, now Delphi (5738 ft), in the centre, being the highest peak. Chalcis and Eretria, the chief tns, were both Ionic settlements from Attica, which in their turn founded Cumae and Rhegium, etc., in Magna Graecia. Eretria was destroyed and its inhab. carried off to Persia during the great invasion of 490 bc. In 506 bc the Athenians estab. a hated cleruchy in Chalcis because that city had joined the Spartan league. After an ineffectual revolt, Pericles reduced the is. to submission to Athens in 446. After some

years of independence E. fell successively under Macedonian, Rom., and, during the Middle Ages, Venetian rule. From 1470 onwards it was subject to Turkish domination, but in 1832, it was incorporated with independent Greece. Magnesite and nickel are mined. E. produces cereals, olives, almonds, figs, and dairy produce. Pop. (is.) 150,000; dept (including N. Sporades) 183,700.

Eubulus (fl. 350 bc), Athenian politician, was an orator and a man of some ability; but it is impossible accurately to gauge his merits, as the speeches of Demosthenes, his arch-enemy, are the only source of our information concerning him. E. was largely influential in securing the acquittal of Aeschines, and further advocated peace at any price, a policy hateful to Demosthenes.

Eucaine, synthetic drug, comparable to cocaine in many of its actions, which is used as a local anaesthetic in place of the latter, since it is less poisonous. Two E.s, the α and the β , are prepared, the latter being preferable; they are both derivatives of oxymethylpiperidine, and are prepared originally from acetone. E. is most frequently used in operations on the eye and nose, where it is applied to the surface in solution.

Eucalyptus, genus of Myrtaceae, contains over 500 evergreen trees occurring chiefly in Australia; while certain varieties are cultivated elsewhere, e.g. Algeria and Italy, for commercial purposes. Many reach a height of 150 ft and a girth of 30 ft or even more, and they frequently become hollow; *E. amygdalina* v. *regnans* attains a height of 300 ft. The species are of great economic value, yielding oils, kinos, and useful timber, while the well-known oil of E. is obtained from *E. globulus*, the blue-gum tree. The hydrocarbon 'melitose', a saccharine compound, is derived from the sap of various species of Tasmanian E. Gum and gum resin are yielded by *E. pauciflora*, *E. haemostama*, and other species. *E. coccifera*, *E. gunnii*, and *E. viminalis* grow outdoors in mild dists. of Britain.

Eucharist, **The** (Gk, meaning 'thanksgiving'), one of the earliest names for the act of worship instituted by Christ at the Last Supper. The Gospels tell us that in blessing the bread and wine Christ 'gave thanks' over them. It was the common Jewish method of blessing to give praise to the name of God over a thing or person. The memorial of His death instituted by Christ thus became known as the Giving of Thanks, the E., the sacrifice of praise and thanksgiving. Other names for it in the N.T. are the Breaking of Bread, and the Lord's Supper (this last perhaps including the Agape (q.v.), which at first was associated with it). In the East the service is usually called the Liturgy (q.v.). Catholics in the W. commonly call it the Mass (q.v.). Protestants, in accordance with their rejection of the Catholic teaching concerning the rite as a sacrifice, abandoned all such terminology and used the title 'Holy Communion' (q.v.), 'the Lord's Service', or 'the Lord's

Supper,' which avoided such implications. The Church of England did the same, but recognised the name Mass as in common use in Elizabethan times; and it is in fact increasingly used now by High Churchmen though there is much prejudice against it as implying Rom. Catholic teaching and beliefs.

The Gk verb *eucharistein* (to give thanks) was in early times used (so Justin says) in the sense of 'to consecrate,' and the word E. came to mean the consecrated elements, as well as the whole Eucharistic rite. So Irenaeus says that after consecration the bread is no longer common bread, but E., consisting of 2 parts, an earthly and a heavenly. This is the common teaching of both the Catholic and the Orthodox Churches and can be traced (as the quotation given shows) to the earliest times. It is also thought by Catholic scholars to be the teaching of the N.T., which is principally contained in the accounts of the Institution given in the synoptic Gospels, in the eucharistic teaching given in John vi. and xv., and in I Cor. xi. Some Protestant scholars agree that this is in some sense true.

The Rom. Catholic Church declares that, at the consecration, the Bread and Wine really and truly become the Body and the Blood of Christ by Transubstantiation (q.v.). Since Christ cannot be divided, this means that he is totally present, as God and Man, with his Body and Blood in either form of the sacrament. This is known as the doctrine of concomitance. The nature of Christ's presence in the Sacrament is real, but substantial in the metaphysical sense of substance; it is not a carnal and physical presence, nor is it spatial, though the sacrament is. For a classical exposition of this teaching, see the famous hymn sequence, *Lauda Sion* by St Thomas Aquinas.

Protestant teaching at the Reformation repudiated the Catholic doctrine of Transubstantiation, partly, perhaps because of the crude mis-statements and carnal misinterpretation of it that were widespread. Luther insisted strongly on belief in the Real Presence (q.v.), affirming however that the Bread and Wine are not changed at the Consecration, but somehow united with the Body and Blood of Christ. This is usually called the doctrine of Consubstantiation (q.v.). It differs from the Rom. Catholic teaching in stating that the (metaphysical) substance of Bread and Wine still exists after consecration, while Transubstantiation asserts that it no longer exists, though the species (physical qualities) do. Other Protestant reformers were more radical in their revision of sacramental teaching than Luther, asserting that the Bread and Wine remain plain bread and wine, unchanged. Zwingli taught that in receiving the Sacrament one merely reminds oneself of the death of Christ, and of one's union with him; Calvin that one not only did this, but in receiving the sacrament, at the same time, received Christ (though not in the sacrament). This last view is

called Receptionism. The Church of England permits her members to hold any of these views, though the majority of her people in fact believe in the Real Presence of Christ in the Sacrament, while not defining exactly what this means in the metaphysical sense. There are some Anglicans who actually believe in Transubstantiation, in spite of Article 28 condemning it. The binding authority of the 39 Articles on Anglicans is weak.

Another controversy between Rom. Catholics and Protestants concerns the nature of the Eucharistic rite. Catholics assert that from the first the E. has been regarded in the Church, and was instituted by Christ as, a sacrifice perpetuating on earth the offering that he perfected on the Cross and is forever pleading and presenting in Heaven: 'Do this in remembrance of Me' means 'Do this as a memorial before God of me.' Protestants, however, deny altogether the sacrificial nature of the E., and the priestly nature of the ministry that it involves. They regard the service as a memorial before men, reminding them of the death of Christ, and as in some way an act of communion with one another and with Him by eating and drinking ordinary food together, as at the Last Supper. The Church of England embraces holders of all these conflicting points of view.

At a very early date the liturgical nature of the E. developed considerably, and it has been suggested that St Paul's account of the institution was taken from an existing order of service. It is impossible here even to touch on the development of liturgiology, but these main groups of liturgy may be mentioned: the Rom., the Gallican, the Alexandrine, and the Antiochene, containing the liturgies of St Basil and St Chrysostom. There is no doubt that the E. was at first celebrated in the evening after supper. But it is equally certain that the change from evening to morning was universally made at a very early date. It is sometimes held that this change was made by St Paul in the Corinthian Church. St Augustine (*ad. Januar.*) makes no reference to the occasion of the alteration, but says, 'It has seemed good to the Holy Spirit that, for the honour of so great a sacrament, the Lord's Body and Blood should enter the Christian's mouth before other food. It is for this reason that the custom is observed throughout the world.' Fasting communion made a morning celebration the ordinary procedure, though it is probable that on fast days, when the faithful sometimes were fasting till 3 p.m., it would take place later. The practice of Evening Communion was received by Protestants as being more truly commemorative of the Last Supper. They also abandoned Fasting Communion in accordance with their views of the Sacrament as ordinary food. High Churchmen in the Church of England have strongly resisted these innovations. After the Second World War the Pope modified the rule of Fasting Communion and permitted Evening Mass and Holy Communion for Rom. Catholics,

owing to the increased stress of modern industrial life. In all the earliest references to the Holy E., it is considered that those who are present at the Consecration will all communicate. All those who had been present at the early part of the service but were unable to communicate had already departed at a given signal before the central act of the service began. Those who had departed would include the insane, the catechumens, and certain classes of penitents. The faithful all remained and all communicated with the priest.

The first falling away from this standard is shown in the second canon of the Council of Antioch (AD 344) when it is ordered that those who attended the service as far as the lections, but refused to communicate, should be cast out of the church until they repent and confess. The separation being effected by the exorcist. Until the 12th cent., it is admitted by all writers that the laity received the sacrament under both kinds in all solemn public administrations, though the species of bread alone was used under special circumstances. In certain parts, the custom of receiving the species of wine through a tube sprang up on account of the great fear which was felt lest any of the sacred element should be spilt. The greatest care was taken that no portion of the consecrated bread should fall to the ground. In the Catholic Church the chalice was withdrawn from the laity gradually from about 1100 onwards, and Communion has been given in one kind (bread) only ever since. This was a cause of great dispute at the Reformation, and all the Reformed Churches restored the chalice to the laity. In the East the custom of receiving the Blood of Christ by the method known as *intinction* early began. The consecrated bread is broken up and placed in the chalice, the 2 elements being given together into the communicant's mouth by a spoon. It is generally agreed that the early Christians received the sacrament standing, this being the usual posture for prayer on the Lord's Day and during Eastertide. Communicants, of course, had to be baptised persons and not under eccles. censure. The importance of private confession to a priest is insisted on in sev. places before the end of the 8th cent. An Eng. example occurs in the *Penitential* of Archbishop Theodore (c. AD 700), where a profession is made for dispensation from the rule if necessary. After special cases of excommunication and penance, reconciliation by the bishop or his deputy was, of course, necessary.

As for the days on which the E. was celebrated, our starting point is the celebrated passage in the Acts (ii. 46) which is sometimes held to imply *daily* celebration. Particular mention, however, is later made only of the Lord's Day (xx. 7), and later allusions in the early writers make it comparatively clear that the Lord's Day was long regarded as the special day for 'the breaking of bread,' as it is now. The days next fixed for communion were the 'Station Days,' i.e. Wednesdays and Fridays. When at Rome the Pope celebrated in a

particular basilica. Daily celebrations were, however, in use by the time of Chrysostom. We may infer from a canon of the Council of Eliberis (c. AD 300) that at that time weekly communion was the regular rule of the church universal, and such it continued to be in the E. until the end of the 7th cent. Bede, when writing to Egbert, says that even the more devout amongst the Eng. laity do not communicate except at Easter, Christmas, and Epiphany, but advises insistence on daily communion, which he speaks of as the custom among many of the continental churches. The Church of England insists on communion 'three times a year of which Easter shall be one.' The Rom. Catholic Church, while encouraging frequent and daily communion (see PIUS X), requires it under pain of sin only once a year 'at Easter or thereabouts.' See B. J. Kidd, *The Thirty-nine Articles*, 1899; B. Frischkopf, *Die neuesten Erörterungen über die Abendmahlsfrage*, 1921; M. de la Taille, *Mysterium Fidei*, 1922; Y. Brilioth, *Eucharistic Faith and Practice*, 1930; W. Simpson, *Eucharist, Sacramental Principles*, 1932; A. O'Neill, *Mystery of the Eucharist*, 1933; G. Dix, *The Shape of the Liturgy*, 1943. See also COMMUNION, CONSUBSTANTIATION, IMPANATION, MASS, REAL PRESENCE, TRANSUBSTANTIATION, and the references under CHRISTIANITY.

Euchlorine, explosive, yellowish-green coloured gas, first prepared by Davy by heating hydrochloric acid with potassium chlorate. It has an extremely irritating odour, and is a powerful oxidising agent. It consists of a mixture of chlorine and chlorine dioxide, ClO₂.

Euchorite, basic arsenate of copper occurring as a distinct mineral. It is related to clinoclase, cornwallite, and tyrolite, all of which are generally isomorphous with the corresponding phosphates of copper.

Euchre, game of cards, popular in America, but not played until the end of the 19th cent. Thirty-two cards are used, all cards below 7 being rejected. The cards rank as at whist with the exception of the 'bowers.' The knave of trump suit (right bower) is the best trump; the knave of the same colour (left bower) is the next best, that card belonging to the trump suit. Each player receives 5 cards from the dealer by 2 or 3 at a time, the top card turned up being trumps. When two play, the non-dealer either 'orders up' the trumps or passes. If he passes then the dealer either takes up the trump or passes. If both pass, the non-dealer may call other trumps or may pass again when the dealer makes. If both pass again the hand is thrown in and the cards are dealt again. If the hand is played the non-dealer leads and the dealer plays and must follow suit if possible. The game then continues as at whist; if a player 'ordering up,' or taking up, or making the trump wins five tricks (a march) he scores 2 points; if 3 tricks (the point) he scores 1. If he fails to make 3 tricks he is euchred, and his opponent scores 2. Game is 5 up. Four-handed E. is generally played. Then the players cut for partners. If the first hand passes,

the second may assist, when his partner the dealer takes up the trump and the hand is played. If a player has a very good hand he may play alone against the other three. But he can only play alone when his partner 'orders up,' or when his partner assists, or when he takes up the trump, or when he orders the trump. The scores are reckoned as before, except that a player playing alone scores 4 points if he wins 5 tricks.

It may be noted that E., under very different rules, is a very popular game in the sergeants' messes of the Brit. Army. In this form of E., the number of cards in the pack varies according to the number of players. For 4 players, the cards are the joker, red deuce, black deuce (the Bonnies), and ace to ten of each suit; for 5 players, add to the foregoing the nines of each suit; for 6 players, add the eights of each suit and 2 black sevens.

The cards change value according to the suit which is trumps. With a red suit: joker, red benny, black benny, the 2 red knaves (bowers) and the other cards in whist order. With a black suit the black benny and the red bonny change places, the black knaves take the place of the red knaves, which drop into their usual place as in whist. The knave of the suit called as trumps takes precedence over the other knave. Each player receives 5 cards, dealt 2 or 3 at a time; the top card of the remainder is turned up and becomes trumps. Each player in turn has the choice of calling, the dealer being last. If the suit turned up is called, then the dealer picks the faced card up and discards. If the nominated suit is not called, then the dealer turns it down and the call again goes round in any suit except the turned-down. Five-card E. is the form usually played, in which there are partners. The caller calls 2 suits: the first, trumps; the player holding the highest card of the second suit is his partner (buddy) but does not declare himself. If the caller and his partner take 5 tricks (a march), 2 points are scored; if 3 tricks, 1 point; if they fail to take 3 tricks they are euchred, and all their opponents score 2 each. When a player is 'low man' (has scored fewest points) he may 'call on his own' (without a partner). A march in this case scores 1 point for every player, and for 3 tricks half this number (3 points for 5 players, etc.). The first player to reach 7 points drops out of the game and the others follow at the same figure. When only 3 or 2 players remain, there are no partners.

Eucken, Rudolf Christoph (1846-1926), Ger. philosopher, b. Aurich, educ. Göttingen and Berlin. After teaching at Basel (1871-4) he was appointed to the chair of philosophy at Jena, which he held until 1920. In 1908 he won the Nobel prize for literature. Of his numerous works the most valuable are *Die Methode der aristotelischen Forschung*, 1872, and *Geschichte der philosophischen Terminologie*, 1879. His later writings are concerned more with ethical and religious problems; these include *The Life of the Spirit* (trans. 1909) and *Mensch und Welt*, 1918. See

W. R. Boyce Gibson, *Eucken's Philosophy of Life*, 1906; M. Booth, *Eucken, His Philosophy and Influence*, 1913.

Eucalase ('easily fracture'), very rare mineral bearing some relation to beryl, and found in Brazil and the S. Urals.

Euclid (c. 330-c. 275 bc), Gk mathematician, b. at Alexandria. His life is practically a blank, but many of his treatises, including the famous *Elements* (*Stoicheia*), have come down to us. This work, which includes 5 books on plane geometry, 1 on proportion, 3 on the properties of numbers, 1 on incommensurable magnitudes, and finally 3 on solid geometry, was for centuries the textbook on geometry in all schools, and has only in comparatively recent years been superseded on the Continent and in the U.S.A. His *Data* (*Nedomena*) contains 95 theorems, in which it is shown that, given certain hypotheses, other things are deducible. The *Phainomena* deals with the appearances produced by celestial motions. The musical treatises, entitled *Introduction to Harmony*, and *Section of the Scale*, and the *Optics* and *Katoptrics*, etc., are of doubtful authenticity. See T. Heath, *The Thirteen Books of Euclid's Elements* (trans.), 2nd ed., 3 vols., 1926. See also GEOMETRY.

Euclid, or Eucleides, of Megara (c. 450-c. 380 bc), Gk philosopher, one of the most zealous disciples of Socrates, and also the founder of that school of philosophy variously called the Megarian, dialectic, or eristic. His philosophy prepared the way for the sceptics, for he delighted in proving contradictory propositions and so encouraged doubt. His writings have all perished.

Eudaemonism (from Gk *eudaimonia*, which describes the condition of a man under the care of a kindly spirit or genius), a much abused term in philosophy in the sense that every writer has contorted or enlarged its meaning to express his own ideas. As a system of philosophy E. upholds happiness as the chief goal of man, the confusion arising from the diverse conceptions of what is essential to that state. According to Aristotle the truly *eudaimones* are those who enjoy a contemplative existence without material anxieties, and without an impediment to the full and complete realisation of their highest self. Plato conceived a magnificent social 'eudaemonia', to which every member of the state contributed, and in which everyone shared. For the Epicureans E. was equivalent to hedonism (see ETHICS).

Eudemus of Rhodes, pupil of Aristotle (q.v.). The *Eudemian Ethics* attributed to him is probably no more than an edition of a course on ethics by his master. Fragments of his history of astronomy and mathematics have survived; there are editions by Spengel, 1866, and Mullaoh, 1881.

Eudialyte, or Eudyalite (Gk 'easily dissolved'), a vitreous basillite of calcium, sodium, iron, zirconium, and other elements found in Greenland in the form of pink rhombohedral crystals.

Eudiometer (from Gk *eudios*, and *metron*, measure), was primarily an apparatus to determine the purity of air, that is the amount of oxygen in it, but it is now generally used for the analysis of gases and especially of gaseous mixtures. A E. consists essentially of a graduated glass tubular vessel fitted at the top with platinum electrodes for the introduction of the electric spark. As a measure it depends on the observation of the amount of shrinkage after one or more chemical reactions in the vol. or vols. of the gas or gases under consideration. In the case of air the reaction is set up by the explosion caused by the introduction of an electric spark. A known vol. of the atmosphere is confined with about half its vol. of hydrogen. After an electric current has been passed through the mixture, all the oxygen of the air unites with some of the hydrogen to form aqueous vapour, which soon condenses. The shrinkage therefore measures 3 times the vol. of the oxygen, this gas combining with twice its own vol. of hydrogen to form water.

Eudocia, or **Athenais** (c. 395-c. 460), wife of Theodosius II., Byzantine emperor, was the daughter of an Athenian sophist. She was converted to Christianity by Pulcheria, sister to the Emperor Theodosius, whom she (E.) eventually married (421). She went to Jerusalem, and became implicated in the Monophysite controversy (453), but St Euthymius finally reconciled her to the true faith. Among her works were a paraphrase of the Book of Daniel and a poem on her husband's Persian conquests.

Eudoxus, 1. Gk navigator, was dispatched in 325 bc by Ptolemy Evergetes, king of Egypt, to explore India and the Arabian Sea. His adventures are recounted by Strabo, who included E.'s discoveries in his great geographical work.

2. of **Cnidus** (c. 407-c. 355 bc). Gk astronomer, studied under Plato for some time, spent years in Egypt, learning from the priests, and later opened a school in Athens which rivalled that of Plato. According to Pliny and Strabo he first fixed the length of the year as 365½ days, whilst Vitruvius ascribes to him the invention of the sun-dial. He was also a mathematician and philosopher, and was much admired by Cicero.

Euganean Hills (It. *Colli Euganei*), range of low, wooded, volcanic hills in Veneto (q.v.), Italy, extending for about 10 m. between Padua and Este (q.v.). The highest point is Mt Vonda (1980 ft). There are many fine villas on the hill slopes. Petrarch spent his last years here, at Arquè (q.v.).

Eugène, François, Prince of Savoy (1663-1736), Fr. gen., b. Paris. He was the youngest son of the count of Soissons, grandson of the duke of Savoy and related, on his mother's side, to Cardinal Mazarin. He was originally intended for the church, but his tastes were more for military renown. After his father's death, and on the refusal of Louis XIV to give him a commission, he left France and

served under Emperor Leopold as a volunteer against the Turks. He displayed great courage in the coalition war in Italy against France and covered himself with glory. He became a field-marshal in 1693, and put an end to Turkish power in Hungary by winning the famous battle of Zenta in 1697. He commanded the It. army in the War of Succession in 1701, but effected little of importance, owing to the smallness of his forces. In 1703 he became president of the council of war, took over command of the imperial army, and assisted Marlborough to win the battle of Blenheim, 1704. After being checked by the Fr. gen., Vendôme, and twice wounded he defeated the Fr. and drove them out of Italy. He shared with Marlborough, the victories of Oudenarde and Malplaquet. After the retirement of England and Holland from the struggle, Prince E. was unable to withstand the enemy on the Rhine, and was defeated by Villars in 1712. In 1716 war with the Turks recommenced, and the prince was everywhere successful. He defeated an army twice the size of his own at Peterwerdein, took Temesvar, and after a desperate battle took Belgrade by assault. After the Peace of Passarowitz, he laboured with unwearied energy in the cabinet. He died at Vienna. See lives by G. B. Malleson, 1888; Lt.-Gen. Sir G. MacMunn, 1934.

Eugene, city of Oregon on the Willamette R. The chief industries are flour milling and the manuf. of furniture and woollens. It is the seat of the Univ. of Oregon and Northwest Christian College. Pop. 35,880.

Eugenia, genus of Myrtaceae, contains numerous species, all of which grow in the tropics, and many bear edible fruits. The best-known plant in the genus is *E. caryophyllata*, which produces the cloves of commerce; they are the dried flower-buds of the tree. *E. Malaccensis* is known as the Malay apple, or rose apple.

Eugenic Acid, see EUGENOL.

Eugenics, that science which has for its aims the perpetuation of those inherent and hereditary qualities which aid in the development of the human race. (See BIOLOGY—*Practical Value of Biology*.) Sir F. Galton—who first coined the word E. in his work on *Human Faculty*, 1869—by his valuable research work and his many pubs. added considerably to the importance and value of the science. Not only this, but in his will he left sufficient money to found the Galton Chair of Eugenics at the London Univ. Attached to the chair is a valuable library and laboratory. The Galton Laboratory for National Eugenics publishes the *Annals of Eugenics*, the *Eugenics Laboratory Memoirs*, the *Eugenics Laboratory Lecture Series*, and the important *Treasury of Human Inheritance*, an extensive collection of family pedigrees, illustrating the inheritance of physical, mental, and pathological characters in man. Besides the works of Galton, there is an extensive literature on E. See F. Galton, *Probability the Foundation of Eugenics*,

1907; S. J. Holmes, *Studies in Evolution and Eugenics*, 1923; O. Neurath, *Modern Man in the Making*, 1939; also G. K. Chesterton's counterblast, *Eugenics and Other Evils*, 1922; T. Kemp, *Genetics and Disease*, 1952. The E. Society was formed in London in 1911 to promote the study of national E., and publishes a quarterly review. See also HEREDITY; MENDEL AND MENDELISM.

Eugénie, **Marie Ignace Augustine de Montijo** (1826-1920), empress of France, daughter of the Count of Montijo, b. at Granada, Spain. In 1853, at Notre Dame, Paris, she was married to Napoleon III, and 3 years later their only son, the prince imperial, was b. Her influence on her husband's policy was a bad one: she encouraged court extravagance, was at least partly responsible for the Mexican tragedy, and urged Napoleon to fight Prussia in 1870. She fled to England after Sedan, settling at Chislehurst, and later at Farnborough. Her husband d. in 1873 and she lost her son in the Zulu War of 1879. She d. while on a visit to Madrid. See lives by M. Paléologue (Eng. trans.), 1928; R. Sencourt, 1931; and O. Aubry, 1939.

Eugenin ($C_{10}H_{12}O_2$), substance which is obtained from oil of cloves.

Eugenius, name of 4 popes: E. I (St.), pope from 654-7, festival, 27 Aug.; E. II, pope from 824-7; E. III, pope from 1145-53; and E. IV, pope from 1431-47. The latter's pontificate was marked by a schism, created by proceedings in the council of Basel towards the reform of the Church and the limitation of papal authority. He excommunicated the council and the council deposed him, but he succeeded in re-uniting the Church round his own person and office. Holding a council at Florence, he concluded a re-union with the Gk Church (1439), and later with Armenians (1439), Jacobites (1443), and Nestorians (1445).

Eugenol, or **Eugenic Acid** ($C_{10}H_{12}O_2$) is obtained from oil of cloves by extraction with sodium hydroxide and decomposition of the resulting sodium eugenate with dilute sulphuric acid. It is a colourless or pale yellow liquid, boiling at about 252° C., and is used as an antiseptic and local analgesic in dentistry, as a constituent of cellulose acetate varnishes, and for the production of isoeugenol for vanilla flavouring.

Eugubine (or **Iguvine**) **Tables**. These tablets, numbering 7, were found in the 15th cent. at Iguvium, the modern Gubbio (Umbria, Italy). They contain large texts, which are engraved on both faces of the tablets, and have been deciphered as parts of the liturgy of a sacred brotherhood of Iguvium. T. I-IV and part of the Vth are written in Umbrian script, which is not only an offshoot of the Etruscan (q.v.) alphabet, but is so close to its classical form that eminent Etruscologists, such as the late It. Prof. Giulio Bonamici, consider it as Etruscan. These tablets are attributed by some scholars to the 4th or even the 5th cent. BC, by others to the 2nd or 3rd

cent. BC. The rest of T. V and T.s VI and VII are written in Rom. characters and are assigned to the 1st cent. BC.

Eugubium, see Gubbio.

Euhemerus and **Euhemerism**. The latter is the name applied to the historical theory of the origin of mythology, founded by the former, a native of Messene about the 4th cent. BC. While voyaging to the Indian Ocean he discovered (so he claimed) an is. called Panchala, and on it a number of inscriptions representing the gods of Greece as mere humans, deified after death for their superior strength and abilities. His *Hiera Anagraphe* led to his being accused of atheism and his name became a byword for mendacity. Later, however, many (e.g. Polybius, Lactantius, and St. Augustine) adopted the theory. Later Gk writers simplified it, eliminating extravagances and leaving a number of commonplace and credible stories. Aeolus became an anet mariner; the Cyclopes, a race of savages inhabiting Sicily; Atlas, an astronomer; Scylla and Pegasus, fast-sailing pirates. The system survives in some current handbooks of mythology. It was the favourite theory of the 18th cent. in France. It reached England in a trans. of Abbé Bauer's *Mythology and Fables of Antiquity Explained from History*. Vossius, Bochart, and Huet belong to this school; Gladstone was its able exponent. Herbert Spencer used it to explain also the origin of religion in his *Principles of Sociology*, 1877-90. See also ANCESTOR WORSHIP.

Eulenspiegel (Ger. for 'owl-glass'), the prototype of all knavish fools of later times, b. at the end of the 13th cent., near Schöppenstadt, in Brunswick. He was 3 times baptised, once in the font, secondly in the mud, and the third time in hot water. He wandered over Europe, experienced many wonderful and comical adventures, and perpetrated many knavish tricks. His place of burial is not certain, as 2 places claim to have his bones in their respective churchyards. One stone stands to his memory at Mölln, near Lübeck, where he is supposed to have died in 1350. His bones are also at Damme in Belgium, where his death is placed about 1307. In modern times his story is embodied in one of the masterpieces of Belgian literature—*Till Eulenspiegel en Lamme Goedzak* by C. de Coster. The first ed. appeared in 1868. It is really a kind of epic which celebrates the struggles of the people to secure freedom from Sp. tyranny. Gerhard Hauptmann, the great Ger. poet and dramatist, pub. a vast poem called *Eulenspiegel*, in parts so mystic that it puzzled his critics.

Euler, Leonhard (1707-83), Swiss mathematician, b. at Basel, and studied under John Bernoulli. He went to St Petersburg, where he became prof. of physics in 1730, and in 1733 of mathematics in the Academy of Sciences. In 1741 he was invited to Berlin by Frederick the Great, and he pub. many valuable papers during this period. His later years were spent in St Petersburg in almost total blindness, but his servant wrote at his master's

dictation. The *Introduction to Algebra* (trans. 1840) was completed in this way. His chief works are: *Theory of Planetary Motion*, 1765; *Institution of Differential and Integral Calculus*, 1855; *Introduction to Analysis of Infinities*, 1748. In addition to his work on pure mathematics he made important contributions in various branches of applied mathematics and science, such as *Lettres à une princesse d'Allemagne sur quelques Sujets et de philosophie*, 1708-72, written for the use of the princess Anhalt-Dessau; *Dioptrics*, 1771. See lives by S. Schulz-Euler, 1907; A. Speiser, 1934. See also EULERIAN NUMBERS; HYDROKINETICS—Euler's Equations of Motion.



LEONHARD EULER

Engraving after a painting by E. Lorgne

Eulerian Number. Named after Euler (q.v.) (1707-1783), the Swiss mathematician. The expansion of $\cos x$ is $\cos x =$

$1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots$, and the expansion of

$\sec x = \frac{1}{\cos x}$ may be written

$1 + \frac{A_1 x^2}{2!} + \frac{A_2 x^4}{4!} + \frac{A_3 x^6}{6!} + \dots$ where $A_1,$

$A_2, A_3,$ etc., are known as E. N.s, the first 9 of which were first computed by Euler. x is expressed in radian measure in the series. The first 5 are 1, 5, 61, 1385, 50521, and the 50th contains 127 figures. Some of the properties of these numbers may be noted here, viz., every E. N. is a positive odd integer; the sum of any two successive E. N.s is divisible by 3. The chief usefulness of E. N.s is in the summation of certain series.

Eumaeus, faithful swineherd, who recognised Ulysses on his return from Troy, and helped him destroy the suitors of Penelope.

Eumenes (c. 360-316 BC), Macedonian

general, and a native of Cardia in the Thracian Chersonesus. At a very early age he was employed as private secretary by Philip II of Macedon, and, on the death of that prince, by Alexander. When Alexander died Cappadocia, Paphlagonia, and Pontus were assigned to E. He was put to death by Antigonus.

Eumenes I, king of Pergamum. He succeeded his uncle, Philetaerus, in 263 BC. The only event of importance in his reign was his victory near Sardis over Antiochus Soter, which enabled him to secure possession of the districts round his cap.

Eumenides (the 'benevolent'), euphemistical name for Erinyes (Rom. Furies, or Dirae), 3 hellish maidens who haunted men guilty of perjury, murder, inhospitality, or violation of filial duty. Their names were Alecto, Megaera, and Tisiphone. In the poets there is sometimes only one, and in Aeschylus, a whole chorus of them. Later, sacrifices of sheep and nephalla (honey and water) were offered to them, while poets and sculptors represented them as winged virgins, dressed as huntresses, but with serpents, encircling their heads. See J. G. Lawton, *Modern Greek Folklore and Ancient Greek Religion*, 1910.

Eumenius: (1) Trojan killed by Camilla in Italy (see Virgil, *Aeneid*, ii).

(2) Gallic rhetorician, b. at Autun about AD 280. He was grandson of Glaucus, the Athenian rhetorician who had settled in Gaul. E. practised rhetoric successfully both at Autun and at Rome. He was appointed to the court of Constantius Chlorus, and put at the head of a new college in Autun. Of the panegyrics attributed to him, one was made before the Emperor on the occasion of the retaking of Britain; another deals with the foundation of colleges; the 3rd in praise of Constantina Augusta, was spoken at Treves and is full of hyperbole. These speeches have frequently been reprinted, especially in the collection known as the *Duodecim panegyrici veteres* (ed. E. Bährens, 1874).

Eumolpus ('sweet singer'), son of Poseidon and Chlone, a legendary priest, poet, and warrior. The Eleusinian mysteries were believed to have been founded by E. As priest E. purified Heracles from the murder of the centaurs; as musician he taught him to play the lyre. He is said to have been the first priest of Dionysus, and to have introduced the cultivation of the vine and fruit trees.

Eunapius (c. AD 345-420), Gk historian and adherent of the neoplatonic school of Iamblichus, b. at Sardis. Fragments of his *Historical Memoirs* (AD 270-404) and *Lives of the Sophists* (i.e. the later neoplatonists) have survived. The latter was ed. by T. F. Bossonade (1822) and (together with a work of the same name by Philostratus) by W. C. Wright (Loeb Library, with trans.), 1922.

Eunomius, leader of an extreme sect of Arians, who were called after him Eunomians. His confession of faith addressed to Theodosius in 383 was rejected. After

his death his followers disbanded through internal divisions.

Eunuch (Gk *eunukhos*, one who has charge of a bed), etymologically, one who has charge of women's apartments in the E. countries. The term, however, applies particularly to a person who has been castrated in order to serve as attendant in a harem. Sometimes E.s occupied high official places in the state, so that the word E. was applied to a high official, the chamberlain. The barbarous custom of castration was probably earliest practised in Africa, but it was also a custom among the Romans. As late as the 17th and 18th cents. male castrati were employed in church choirs and on the operatic stage to sing soprano and contralto parts.

Euonymus, family *Celastraceae*, genus of about 120 species of trees and shrubs. *E. europaeus*, the Spindle Tree, grows in Britain; *E. alatus*, winged Spindle Tree, comes from China, both deciduous, with ornamental fruits. *E. japonicus*, Japan, *E. radicans*, and *E. nanus*, Orient, are popular evergreens.

Eupatoria, see YEVPATORIYA.

Eupatorium, a genus of *Compositae*, which takes its name from Mithridates Eupator, king of Pontus, who first recognised its medicinal properties. There is only one Brit. species, *E. cannabinum*, the hemp-agrimony, which grows in marshy soil. Formerly it was valued as a medicine. It is abundant in America. *E. perfoliatum*, or cross-wort, is used as a substitute for Peruvian bark.

Eupatridae (lit. 'the well born'), members of the old Athenian nobility. Their privileges were abolished by Solon (q.v.).

Eupen, industrial town with a hydro-pathic. estab. in the prov. of Liège, Belgium, 9 m. S. of Aachen. By the treaty of Versailles (1919) it was stipulated that the dists. of E. and Malmédy should be transferred from Germany to Belgium, if the inhabs. wished it, as a subsequent plebiscite indicated. The ceded dist. has an area of 400 sq. m. and a pop. of 60,000, of whom five-sixths are Ger.-speaking. When Belgium capitulated to the Germans in May 1940 E. once more fell to Germany. In Oct. 1944 Amer. First Army troops entered Germany in the Aachen area east of E. which was soon afterwards captured. Pop. (tn) 14,100.

Euphemism (Gk *eu*, well; *phēmī*, I say) is the avoidance of an unpleasant or indelicate word or expression by the use of one which is less direct, and which evokes a less disagreeable image in the mind. Thus 'pass away' or 'join the majority' is used for 'die', 'gentlemen of the road' for 'highwaymen', 'in a vicious condition' for 'intoxicated'. Anet examples are the name *Eumenides* (q.v.), meaning Benign Ones, applied by the Greeks to the Furies, and *Euxine* ('hospitable') used for the stormy Black Sea. See also FIGURE OF SPEECH.

Euphorbia, Family *Euphorbiaceae*, genus of some 1600 herbs, shrubs, and trees widely distributed throughout the world.

Native to Britain are the Spurges with milky juice—*E. lathyris*, Caper Spurge; *E. platyphyllos*, Broad Spurge; *E. stricta*, Upright Spurge; *E. helioscopia*, Sun Spurge; *E. peplus*, Petty Spurge; *E. crigua*, Dwarf Spurge; *E. paralias*, Sea Spurge; *E. cyparissias*, Cypress Spurge; and *E. amygduloides*, Wood Spurge. Many African species are succulent, exuding a milky latex if injured, which may be toxic or of medicinal value; *E. meloformis* of Cape Province is characteristic. E. are characterised by an inflorescence in which flowers are reduced, male to one stamen, female to a long-stalked ovary, surrounded by a series of bracts forming an involucre, itself surrounded by 2 or more larger bracts, and the whole being known as a cyathium. The bracts are often green or yellow, but in *E. pulcherrima*, Poinsettia, *E. fulgens*, and *E. splendens*, Crown of Thorns, the bracts are large and brilliantly coloured red, and the plants are commonly grown as decoratives in warm greenhouses. *E. marginata* is a hardy ann. with white bracts, and *E. epithymoides* is a perennial herbaceous plant.

Euphorbiaceae, a family of Dicotyledons contains over 4000 species of trees, shrubs, and herbs, and is distributed over the whole globe. Many contain dangerously poisonous substances, while some are used as purgatives, others have a farinaceous substance used as food, e.g. cassava, and rubber, castor-oil, and casarilla bark are well-known products. Few of the characteristics are common, but the flowers are always unisexual and regular. There are generally 5 perianth leaves, the stamens may be united or free, 1 to many in number. The ovary is superior, usually with 3 united carpels, and is trilocular, and there are always 1 to 2 ovules in each loculus. Genera include *Aleurites*, *Codiaeum*, *Croton*, *Euphorbia*, *Hevea*, *Hippomane*, *Manihot*, *Omphalia*, *Ricinus*, *Sapium*, *Toxicodendron*.

Euphorbia, derived from the *Euphorbia officinarum* growing in NW. Africa, a violent, irritant, and acrid substance, formerly much used in medicine, especially as a remedy for angina pectoris. The term is sometimes inaccurately applied to the various species of gum-resin.

Euphorbus, son of Prothous, one of the bravest of the Trojans slain by Menelaus (*Iliad*, xvii. 1-60). Pythagoras, who taught the transmigration of souls, declared he had once been E., and claimed his shield, which hung in the temple of Hera near Argos, as his own.

Euphorbia, family *Sapindaceae*, genus of evergreen trees, of which *E. longana* (synonym *Nephelium longana*), India, is the Longyen or Linkeng, with edible fruit.

Euphrasia, genus of *Scrophulariaceae*, contains over 130 species of plants which are semi-parasites, i.e. they have green leaves and carry out photosynthesis, but their roots are attached to other plants from which water and salts are obtained. *E. officinalis* is the common euphrasy, or eyebright, with many related species.

Euphrates (Babylonian *Puratta*; Hebrew *Perath*; Arabic *Frat*), largest riv. of W. Asia. It rises in Turkey in two branches, the Kara Su and the Murad; the former rises about 20 m. NE. of Erzerum, in the Tcheldis Mts, the latter 45 m. NE. from the nearest point of Lake Van. Both these rivs. flow in a SW. direction till they unite near Kebban in about 39° N. lat. and 39° 25' E. long. The united stream then flows SW. to Sunaysat, having forced a passage through the main range of the Taurus Mts and formed a succession of rapids and cataracts. Thence it flows SE. across Syria and into Iraq at Abu Kemal to its junction with the Tigris,

little to the amazing fertility of the region.

Euphrosyne, 'the Joyous One,' one of the Graces, see CHARITES.

Euphuism, the florid mode of speaking and writing in vogue towards the end of the reign of Queen Elizabeth I. It was brought into fashion by the romance *Euphues*, written in 1578 by John Lyly, who in addressing his writings chiefly to women said he would rather see his works 'lie shut in a lady's casket, than open in a scholar's study.' His idea was not to improve, but to amuse. E. did not attempt to render the simplicity of nature, but to be artificial and affected in its



EUPHRATES

E.N.A.

A ferry near Deir-oz-Zor, Syria

and the joint riv., now called Shat-el-Arab, empties itself by sev. arms into the Persian Gulf, after a course of about 1700 m. The present place of junction with the Tigris has been shown by Sir W. Willcocks to be at Garnat Ali, 30 m. higher up than Kurna, the former place of confluence. Formerly the Tigris and the E. preserved each a separate course to the sea. The distance between the two rivs. varies from 20 to 200 m. The prin. tribs. of the E. after it emerges from the mts are, on the r. b., the Sagar; on the l. b. the Balik Su and the Khabur. The riv. is navigable for small craft as far as Bir, a distance of 1200 m., whilst larger vessels can ascend as far as the confluence with the Tigris. The E. has played a conspicuous part in the hist. of the world, as the many ruins of great cities on its banks bear witness; besides Babylon, 'the glory of kingdoms,' Ur, Zarsa, Nippur, and Sippara were situated there. The canal system of the riv. was very complete in early times, and contributed not a

desire for refinement. Dr Landmann (New Shakes. Soc. Tran. 1880-6) gives the following sound description of E.: '(i) An equal number of words in collateral or antithetical sentences, well balanced often to the number of syllables, the corresponding words being pointed out by alliteration, consonance or rhyme; (ii) "Unnatural Natural History," which he (Lyly) learned from Pliny; (iii) An oppressive load of examples taken from ancient hist. and mythology, as well as apophthegms from ancient writers.' Some commentators on Shakespeare have suggested that in *Love's Labour Lost* the dramatist was satirising the euphuists in the character of Don Adriano de Armado, and Scott burlesques E. in his character of Sir Piercie Shaffton in *The Monastery*. But neither Sir Piercie nor Armado talks the E. of its masters. Lyly, Greene, and Lodge. See under LYLY; also C. G. Child. *John Lyly and Euphuism*, 1894.

Eupolis (c. 440-411 BC), Athenian poet of the old comedy. He is ranked by

Horace as one of the greatest writers of his school. In the elegance and purity of his diction he was reputed to be equal to Aristophanes, and in command of irony and sarcasm to rival Cratinus. His plays, of which only fragments survive, included *Kolakes*, *Marikas*, *The Baplae*, *The Demoi*, and *Poleis*. It is not true that he was drowned by Alcibiades, who is said to have thrown him into the sea for having attacked him in one of his plays. See G. Norwood, *Greek Comedy*, 1931.

Eurasian, term used to denote children born of a Hindu mother and a European father. For more than half a century it was confined to India, but is now descriptive of any half-caste.

Eurasians (Russian *Yevraziysky*), ideological and political movement among Russian émigrés in the 1920's and thirties. In contrast to the two traditional conceptions of Russian hist., those of Westernisers and Slavophiles (q.v.), the E. (e.g. philologist Prince N. S. Trubetskoy, economist and geographer P. N. Savitskiy) stressed the Asiatic factors in the making of Russia, and Asiatic elements in Russian culture. Some leading E. (e.g. Prince D. S. Svyatopolk-Mirski) came to consider Soviet Russia as the true realisation of the 'Eurasian' nature of Russia. See *Russia in Resurrection*, by an English Europeanist, 1928.

'Euratom', see under EUROPEAN COAL AND STEEL COMMUNITY.

Eure, dept of NW. France, formed in 1907 from a portion of the old prov. of Normandy. It has 3 arrons., Évreux (the chief tn of the dept), Les Andelys, and Bernay. The ter. of E. is broken up by its rvs. into well-wooded plateaus. Chief products wheat, flax, and beetroot, cattle and horses of pure Norman breed, for which the dist. is famous. Fruit is abundant; the minerals are marl and brick-clay. There are important textile industries, and some metallurgy. Area 2330 sq. m. Pop 316,000.

Eure-et-Loire, dept of N. France, SE. of the dept of Eure. The E. portion is a gently undulating plain, called the Beauce; the W. called the Perche, is more diversified, with hills, forests, and numerous rvs. The chief riv. in the N. is the Eure, in the S. are the Loir and the Huisne. None of the rvs. is navigable save the Eure for a short distance. The Perche dist. has a slightly colder and healthier climate than the Beauce. Wheat and oats are the prin. crops, and apples are largely grown. Textile goods and boots are manufactured and there are foundries. The prin. tns are Chartres (the cap.), Dreux, Châteaudun, and Nogent-le-Rotrou (qq.v.). Area 2291 sq. m. Pop. 261,050.

Eureka, city of California, U.S.A., port on Humboldt Bay, co. seat of Humboldt co., and the most westerly city in the U.S.A. Great quantities of redwood lumber are shipped, and it is a commercial fishing centre; there is dairying and truck farming in the region. Pop. 23,050.

Eureka Stockade, see BALLARAT; DIGGERS' CONFERENCE.

Eurhythmic (Gk *eu*, well; *rhythmos*,

flow) is a method, developed by Émile Jaques-Dalcroze, of teaching music through its realisation and interpretation by movements of the body. By a succession of exercises carefully graded and directed, an intellectual appreciation of rhythm is attained, based on the natural perception of rhythm illustrated by the movements of many people in response to a march or dance music. Later exercises develop the imagination and encourage its expression by free descriptive movements. Attention and concentration, in addition to physical control, are exacted by all the exercises, by means of which the sense of hearing and the judgment of direction and intensity of sound are trained. Concentration is essential, for even momentary wandering causes the movements of the body to be out of time with the music. Moreover, without concentration the high degree of physical control that can be gained would be impossible, for the more difficult exercises demand separate control of each arm, the legs, and head, so that each can move at a different rate from the other and simultaneously express 4 different rhythms. The eurhythmic method of teaching music incorporates the development of mental and physical control, thereby increasing efficiency. See É. Jaques-Dalcroze, *Rhythm, Music, and Education*, 1921.

Euripides (c. 484-407 BC), last of the great Gk tragedians; b. at Phlya in Attica, son of Mnesearchus and Cleito. His wife's name was Melite. There are no grounds for accepting the calumnies of anc. writers that E. was a misogynist and that his mother was of low birth. Nor need we hesitate to reject the story that he was twice married and embittered by the infidelity of both wives. In his youth, E. was an outstanding athlete, winning prizes both at Athens and Kleusis. He was also a skilled painter, and his plays contain sev. references to this art. He received a good education and early came under the influence of such thinkers as Protagoras, Anaxagoras, and Socrates. In later life, his outspoken antagonism to the war-party at Athens, drove him further and further into isolation until, in about 408, he went into voluntary exile, dying next year at the court of Archelaus, king of Macedon. He began his career as a dramatist in 455, winning 3rd place with the *Pleiades*. Not till 442 did he secure the 1st prize, and only 4 times in all. The scientific and philosophic thought expounded in his plays, often approaching religious scepticism, did not find favour with his contemporaries. He represented the new moral and social influences that were affecting Athens, and in the next cent. his popularity increased ten-fold, and many considered his dramas superior to those of Aeschylus and Sophocles. He is noted pre-eminently as a master of pathos and for his delineation of female character. He is interested in the experiences of the ordinary individual, rather than in that of legendary beings, drawing his characters with a fine realistic touch. E. has been called the most

modern of the 3 great Athenian dramatists, and 'the forerunner of Rationalism.' The ancient criticisms of Aristophanes (*Thesmophoriazusae* and *Frogs*) and others are very prejudiced, but Quintilian and Cicero both admired E.

E. was essentially a realist whose art reflected the humours and passions of daily life and the vehicle he sought as his medium was a drama of archaic plots and simple style, not unminged with sheer incongruities; but, seen through his rationalism, the plays became a formidable weapon of propaganda for the 5th cent. Illumination. For E. plot is almost immaterial, for several of his plays seem, in point of plot, to be much the same as the compositions of Phrynichus. He introduced changes in Gk drama: notably

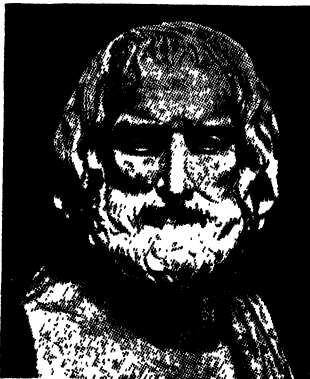
cause of the shipwreck of the vessel in which St Paul was sailing.

Europa, daughter of Agenor, or Phoenix king of Phoenicia, and sister of Cadmus. She was loved by Zeus, who took the form of a white bull and carried her away to Crete, where she bore him Minos, Rhadamanthus, and Sarpedon. After death she was worshipped in Crete as 'Hellotis.' The etymology of her name is disputed. Cf. Persephone. See Horace, *Odes*, iii. 27; Ovid, *Metam.*, ii. 833; A. Pauly-Wissowa, *Realencyclopädie der klassischen Altertumswissenschaft* (vol. vi) 1909.

'Europa,' The, see LIBERTÉ.

Europa Point, the most southerly point of the Strait of Gibraltar (q.v.).

Europe is situated in the N. Temperate zone. It is, except Australia, the smallest of the continents, but is both historically and politically extremely important. Its area is 3,800,000 sq. m., about one-fourteenth of the total land area of the globe, the greatest length being 3400 m., and the greatest breadth 2400 m. Geographically, E. should be regarded as forming with Asia one great div. of the land surface of the globe. Its E. boundaries are the Caspian Sea, Ural R., and Ural Mts. These boundaries do not, however, mark a distinct difference either in flora or fauna; or of political divs., as Russia in E. and Siberia are united in the R.S.F.S.R. The other boundaries are: on the N. the Arctic Ocean, on the W. the Atlantic Ocean, on the S. the Mediterranean Sea, Black Sea, and Caucasus Mts. The boundaries of the R.S.F.S.R. however extend beyond the Caucasus. The coast line of E. is greater in proportion to its size than that of the other continents, being some 50,000 m. The land is penetrated by large seas and gulfs, and its coast-line contains sev. large peninsulas, conditions which greatly favour its trade. The surface is divided into 2 parts, the great central plain, occupying two-thirds of its surface, stretching from the Ural Mts to the Atlantic, and the highlands in the centre and the S. Apart from these 2 divs. is the mountainous dist. of Scandinavia, including the Brit. Isles. The S. system consists of the Alps, Pyrenees, Sierra Nevada, Apennines, Balkans, and Carpathians. The great transverse watershed runs from NE. to SW., and the rivs. therefore flow generally NW. and SE. The 2 chief centres of this watershed are the Valdian uplands and the Alps. From the bogs and lakes of the moraine Valdai Hills flow the Volga (2100 m.) into the Caspian Sea, the Don into the sea of Azov, the Dnieper into the Black Sea, the N. Dvina into the White Sea, and the W. Dvina into the Baltic. From the Alps flow the Danube (1700 m.) into the Black Sea, the Rhine into the N. Sea, the Rhône, Po, and Adige, into the Mediterranean. There are 3 prin. groups of lakes, viz. the Alpine lakes with Geneva, Constance, Lucerne, Neuchâtel in Switzerland; Maggiore, Garda and Como in Italy; Balaton in Hungary; the Scandinavian group with Wiener, Wetter, and Mälär in Sweden and Miosen and Randsfjord in



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in the prologue which, in his plays, assumes the form of versified programme; and in his employment of the device of the *deus ex machina* or god who comes on at the end to wind up the plot whether artistically or not.

Eighteen certainly authentic plays have survived: *Cyclops* (sole surviving complete specimen of a satyr play); *Alceste*, 438; *Medea*, 431; *Hippolytus*, 428; *Andromache*, c. 430; *Hecuba*, c. 425; *Heracleidae*, *Suppliant Women*; *Heracles*; *Ion*; *Trojan Women*, 415; *Iphigenia in Tauris* and *Helen*, 414-412; *Electra*, *Phoenissae*, ? 410; *Iphigenia in Aulis*, *Bacchae*, 406. The *Ihesus* which has come down to us is of doubtful authenticity, but E. is known to have written an early play under that title. See the complete critical ed. by Gilbert Murray. There are numerous eds. of separate plays, and a complete trans. by A. S. Way in Everyman's Library (2 vols.), 1956. See also G. Murray, *Euripides and his Age*, 1914.

Euripus, or **Euripos**, see EUBORA.

Euroclydon, a NE. wind, in the Mediterranean now called *Gregale*. It is mentioned in Acts, xxvii. as being the

Norway; the lakes of the central plain, Ladoga, Onega, Peipus, and Ilmen in Russia; and Saima and others in Finland. The is., with the exception of Iceland, lie near the mainland, the prin. being Great Britain and Ireland, Sardinia, Corsica, Sicily, Iceland, Novaya Zemlya, and Crete.

GEOLOGY.—In earliest geological times the coast of E. appears to have had a greater extension towards the N. and NW., whilst the S. and E. dists. were under the sea. The oldest rocks, those of pre-Cambrian and Palaeozoic age, are most continuous in the N. part of the continent, and extend over a large part of N. Russia, Finland, the Scandinavian Peninsula, and the N. and W. parts of the Brit. Isles. They also occur in Brittany, Central France, and Spain. The newer rocks of the Mesozoic and Cainozoic Periods are generally found on the lower lying lands, but occur nevertheless, in the Pyrenees, Alps, Caucasus, Carpathians, and Apennines. Their most continuous belt is in the central plain from the N. Sea into Russia. During the Cambrian Period the S. part of E. was covered by a shallow sea, while a large sea existed in W. Scandinavia, off N. Scotland, and apparently also in Wales. In the Ordovician and Silurian Periods the continent was further submerged, the Brit. Isles disappearing almost entirely. This was apparently a period of great volcanic activity. Next came the Devonian and Old Red Sandstone Period. The latter was deposited in lakes and inland seas, while the former is of marine origin. Between the Silurian and Devonian periods the sea had receded and left great masses of land uncovered. The Atlantic Ocean, however, still stretched over the S. of England and the centre of E., while submarine volcanic eruption was frequent in Germany. The Carboniferous Period marked a further extension of the sea, which covered Ireland and England, the low grounds of Central E. and a great part of Russia. Volcanic disturbance was frequent, and eventually the sea receded, leaving vast tracts of newly exposed lands. At the beginning of the Mesozoic era, large inland seas appear to have covered parts of E., including the S. portions of the Brit. Isles, and the lower course of the Rhine. Towards the close of the Triassic Period however, the land subsided, and allowed these lakes to become connected with the open sea. During the Jurassic Period the Brit. Isles seem to have risen above sea-level, with the exception of SE. England. Similarly S. France and E. Spain were submerged, and the lower parts of N. Germany and Russia, Italy, and the Balkans were also partly under water. This submergence appears to have lasted for a very lengthy period, but towards the close of the Jurassic Period the land again rose, and in the early Cretaceous Period Middle E. was generally dry. Later on, however, the land again subsided, leaving a vast sea over Central E., while the Mediterranean Sea was of far greater extent than at present, and covered part of France, Spain, Italy, Greece, and was probably connected directly with the

Indian Ocean. At the beginning of the Cainozoic Period the land had again risen and left the centre of E. above sea-level. The S. lands were, however, represented only by is. and narrow peninsulas, a condition which persisted until the late Miocene Period. During the Eocene Period, the Alps, Pyrenees, and Carpathians were thrown up, and a further elevation of the same ranges was effected in the Miocene Period. During the Pleistocene Period the bed of the Mediterranean was elevated, uncovering the lands of S. Europe. Violent changes of surface do not seem to have taken place in the Pleistocene Period, but there were successive elevations and depressions. During this period the Brit. Isles appear at one time to have formed part of the continent, while at a later period large tracts of them again lay under water.

CLIMATE.—The climate of E. is very diverse. There are 4 main climatic zones, the NW. region (stretching from N. Spain through France to Norway), the Mediterranean zone, Central E., and E. E. The NW. region has mild winters, cool summers and cloud and rain all the year around with a maximum in the autumn. The Mediterranean zone is characterised by very mild winters, hot dry summers, and abundant sunshine; most of the rain falls in the spring and autumn. In Central E., winters are cold and the summers warm, with the maximum rainfall in summer. E. E. is notorious for its extremely cold winters. The temperate unsettled climate of the NW. region is accounted for by its position in the main track of the Atlantic depressions (q.v.), its long coast line, and especially by the influence of the Gulf Stream, which keeps the major ports free from ice all the year round. The Mediterranean climate, because of its lack of severe winters, was very favourable for the early development of civilisation, but the hot dry summers, although ideal for the ripening of fruits, are not conducive to hard work. The rigours of the weather in the Central and E. parts of E. delayed the advance of civilisation there for many centuries, but also favoured the development of hardy nomadic hunters. There is evidence to show that about 6000–3000 BC the climate of E. was warmer and wetter than it is now, resulting in dense forests. From about 3000 BC to the beginning of the Christian era the climate gradually became cooler and drier, and man began to spread all over the continent. From AD 800–1200 it is believed that conditions in the N. of E. were much less severe than they are now—this was the period of the voyages of exploration of the Vikings. This was followed by a colder period ('the little ice-age') but from 1850 onwards there has been a general warming of the atmosphere resulting in a slow recession of the glaciers which still continues. See W. G. Kendrew, *The Climates of the Continents*, 1937; C. E. P. Brooks, *Climate through the Ages*, 1949.

POPULATIONS AND POLITICAL DIVISIONS. See ALBANIA; AUSTRIA; BELGIUM; BULGARIA; CZECHOSLOVAKIA;

DENMARK; ENGLAND; FEDERAL GERMAN REPUBLIC; FINLAND; FRANCE; GERMAN DEMOCRATIC REPUBLIC; GERMANY; GREECE; HUNGARY; ICELAND; IRELAND and IRELAND, REPUBLIC OF; ITALY; LUXEMBOURG; NETHERLANDS; NORWAY; POLAND; PORTUGAL; ROMANIA; RUSSIA; SCOTLAND; SPAIN; SWEDEN; SWITZERLAND; TURKEY; WALES; *see also* the articles on individual dists., cos., cities, tns, vils., is., rivs. and mts.

RELIGION.—The European nations are predominantly Christian (*see* the references under CHRISTIANITY). *See also* JEWS.

ART AND LITERATURE.—For architecture, art, language, literature, and music, *see* the national articles under the headings named above. *See also* ARCHAEOLOGY; ARCHITECTURE; ART; ARYAN; INDO-EUROPEAN; MUSIC; PAINTING; SCULPTURE; and the numerous biographies of artists, writers, and musicians.

HISTORY.—This is intended only as a broad survey of events. For more detailed information, *see* separate articles on individuals, events, etc.

From the Greek Communities to the Crusades.—The recorded hist. of E. begins c. 2000–1500 bc with the Gk communities, and its subsequent culture has been indebted to Gk standards to a remarkable extent (*see* GREEK HISTORY (ANCIENT), and CRETE.—*Archaeology*). When E. was threatened by the Persians in the 5th cent. bc, the Gk communities united against the common enemy and averted the danger by their victories at Marathon (490 bc), Salamis (480), and Plataea (479). Though capable of united action in times of extreme peril, Greece was not a corporate whole, but a collection of small independent city states, some with a highly developed and advanced system of gov., but each striving for supremacy over the others. Athens' power was soon envied by the other cities, and at the end of the Peloponnesian war, Athens was taken by the Spartan, Lysander, and its democratic gov. destroyed (404 bc). The ensuing internal struggles of the peninsula made it an easy prey for the rising power of Macedonia, and when Philip was succeeded by his son, Alexander the Great (q.v.), the latter was master of almost all Greece. His amazing victories in Asia (334–323 bc) led to no decisive result, and upon his death his empire disintegrated.

As Grecian power declined, that of Rome grew. In the 4th and 3rd cents. bc Rome conducted a series of successful wars against the neighbouring Etruscan, Lat., and Samnian tribes, and became the leading state in Italy (*see* ROMAN HISTORY). The Gk cities in S. Italy sought help from Pyrrhus, king of Epirus (280 bc). But his ability could not match the might of the Romans, and when he left Italy (274 bc) the remaining states soon acknowledged Rome's supremacy. The latter's triumphant urge for expansion led her into war with Carthage (q.v.), at that time mistress of the E. Mediterranean. The 1st Punic war between Carthage and Rome lasted 264–241 bc. Initially, the Carthaginians controlled the sea, but the

Roms. built fleet after fleet and achieved complete naval supremacy, gaining Sicily from Carthage. Carthage returned to the attack, and during the 2nd Punic war (218–201 bc), Hannibal's (q.v.) military genius seriously threatened the power of Rome. In spite of crushing defeats at Trasimene and Cannae the Roms. never yielded, and with the defeat and death of Hasdrubal (207 bc) the tide turned against Carthage. The 3rd war (149 bc) saw the total destruction of Carthage (146 bc). From then onwards, Rome went from conquest to conquest; all Europe S. of the Danube and W. of the Rhine, including much of Britain, Asia Minor, and W. Africa fell under her sway. In the areas that she conquered Rome introduced her culture and political institutions. Her conquests aggravated the cleavage between the rich and the poor, while her huge armies prepared the way for a military dictatorship. Julius Caesar's (q.v.) ambition and the astuteness of Augustus (q.v.) estab. the Rom. empire. Constantine (q.v.) made Christianity the official religion of Rome (AD 334), a decision which decided the religious future of all E., even of those regions which Rome was never to conquer.

In 323 the cap. was transferred to Constantinople, and from 395 the Rom. dominions were divided into empires of the E. and W., both threatened by barbarian invaders. In the W. the Empire was crumbling away as its pop. fell and a stifling bureaucracy discouraged all initiative: slowly, its frontiers were pushed back by the invading tribes from the W. and E. In 451 the Huns invaded E. under Attila, and the barbarian surge was accelerated. Britain fell to the Angles and the Saxons, Gaul to the Visigoths, Burgundians, and Franks (the latter of whom also conquered W. Germany), Italy to the Ostrogoths, and N. Africa to the Vandals. In the disruption the Christian Church maintained its unity: gradually, the barbarians adopted Christianity, and the pope finally claimed the right of disposing of the imperial crown. During the 6th cent. Italy was invaded by the Lombards, while in the 8th cent. the Muslims swept into Spain and Gaul, to be checked at Tours by Charles Martel (732). The latter's triumphs were continued by his grandson Charlemagne (q.v.) who estab. an empire throughout Central E. from the Ebro to the Danube, and who was crowned holy Rom. emperor by Pope Leo III in 800.

Charlemagne's empire was divided by his grandsons into France, Lotharingia, and Germany, Lotharingia ultimately being parcelled out between France and Germany. Italy broke up into a collection of petty dukedoms and city-states. The next centuries saw a confused series of struggles between the monarchs and their nobles, the latter generally increasing their power at the expense of the former. This instability had its origins in the feudal system (*see* FEUDALISM), now prevalent throughout W. E. During the 9th and 10th cents. the Scandinavian Northmen estab. themselves in Normandy

and S. Italy and harassed England, which was to fall to one of their descendants, Wm. of Normandy, in 1066. In 1054 the Byzantine Church broke off relations with the Papacy, causing a religious breach between E. and W. E. which has never been healed. Palestine had been in Muslim hands since the 7th cent.: but in the 11th cent. the Seljuks conquered the country and Christian pilgrimages there became more difficult. Devout Christians dreamed of a war to liberate the Holy Places: and from the 11th to the 13th cents. the Crusades (q.v.) agitated European affairs, acting occasionally as a unifying, but more often as a disruptive force in the political sphere. A Lat. kingdom existed in Palestine from 1099 until the end of the 12th cent. In the 4th crusade (1202-4) the crusaders were diverted from their true goal and captured Constantinople, an act which, more than any other, caused the breach between the Rom. and Orthodox Churches to become final. The Ger. kings still claimed the title of emperors of the W., but their power was very unreal, and their influence much weakened by the conflict with the popes on the investiture question. The Papacy had gained materially and morally from the centralising and reforming influences of Pope Gregory VII (Hildebrand) (q.v.), and was now a power with which to be reckoned. In Spain a succession of small states was formed as the country gradually freed itself from the Moors, while in E. of E. the Teutonic Knights, whom the failure of the Crusades had left without occupation, turned their attention to the neighbouring country of Prussia and converted the Wends to Christianity.

*From the Hundred Years War (1337-1453) to the Seven Years War (1756-63).—*The Hundred Years War (q.v.), waged by the Eng. kings against France in prosecution of their claim to the Fr. throne, though nearly resulting in a complete Eng. conquest of France under Henry V, finally left France more unified than it had been before. Louis XI broke the power of the feudal lords and his successors were free to devote themselves to foreign conquests. But their designs on Italy brought them into conflict with Charles V (q.v.), who had inherited the Netherlands, Spain, Naples, and Austria, and who was elected emperor in 1519. His son, Philip II, succeeded to the hereditary dominions, but the imperial crown passed to the Austrian branch of the family.

By the 14th cent. the Ottoman Turks were overrunning Asia Minor: in 1453 they captured Constantinople and went on to occupy the Balkans. In 1529 and again in 1683, they even threatened Vienna (see TURKEY.—*History*). The Turkish conquest of Asia Minor and the Balkans gave added impetus to the overseas expansion of England, Spain, and France. The 15th cent. saw the beginnings of the Renaissance (q.v.), although there had been a limited tradition of classical learning in E. since the 13th cent. As a result of the Reformation

(q.v.), Protestantism became dominant in Britain, Scandinavia, and N. Germany, while large Protestant minorities existed in France and Hungary. Much of Central E., though initially converted to Protestantism, was later won back to Catholicism during the counter-reformation. Spain, the most ardent defender of Catholicism, was weakened by the loss of the Netherlands and by Eng. attacks upon her colonies and shipping, while in the 17th cent. the Portuguese reasserted their independence. In France, the religious wars ended with the estab. of the Bourbon dynasty. During the course of the Thirty Years War (1618-48) the Protestant states of Germany were sev. times in serious jeopardy, but were rescued first by Gustavus Adolphus of Sweden, and later by the intervention, for purely political motives, of Catholic France. The treaty of Westphalia left Germany exhausted, the religious divisions being virtually the same as at the beginning of the war, but gave territorial gains to Sweden and France. Sweden was now the leading Protestant power in E.; but her power was destroyed by the ambition of her king, Charles XII, who, after successfully defeating a coalition of Russia, Saxony, and Denmark, led his army into S. Russia, where he was utterly defeated at Poltava (1709). France, which by the treaty of Westphalia had received the prov. of Alsace, was now the strongest power in E., and shortly afterwards defeated Spain, forcing her to the disadvantageous peace of the Pyrenees (1659). Shortly afterwards Louis XIV married the Sp. Infanta Maria Theresa, who became the heiress to the Sp. throne upon the extinction of the male line. The Fr. invasion of Flanders had, however, already raised the jealousy of the other Powers and led to a triple alliance between England, Sweden, and Holland. When Louis's grandson, the duke of Anjou, was proclaimed heir to the Sp. throne, a new coalition was formed (1701) between England, Holland, and Austria. In the war which ensued, the military genius of the duke of Marlborough proved superior to that of the Fr. gens., and Louis was forced to make peace. The king of Spain renounced his right of succession to the Fr. throne, and surrendered the Netherlands, Naples, and Milan to Austria.

While Louis' wars were exhausting France, Prussia was gradually growing in strength. This duchy fell by inheritance to the elector of Brandenburg in 1618, and in 1701 the elector took the title of king of Prussia. In 1740, Frederick the Great (q.v.) invaded Silesia, successfully defending his capture against Austria, France, and Russia in the Seven Years War that followed (1756-63). Poland was partitioned between Russia, Austria, and Prussia in 1772, 1793, and 1795. Russia had risen steadily in importance since Poltava. Peter the Great had extended his hold over the Baltic, founded St Petersburg, and introduced the externals of W. civilisation. France's power was declining. During the Seven

Years War England had sided with Prussia, capturing Canada from France. Louis XV's reign was marked by extravagance and incompetence which led directly to the Revolution.

From the French Revolution to the Franco-Prussian War, 1871.—It is difficult to over-estimate the importance of the Fr. Revolution (see FRANCE.—History). The whole structure of Fr. society was altered irrevocably. The intensity of the convulsion was so great that the rest of E. thought that the country must be prostrate, and was surprised and alarmed to find it arise to a career of conquest. The enthusiasm of the people created a succession of victorious armies with capable gens. to lead them. Hoche, Pichegru, and Moreau were only eclipsed by the far greater genius of Napoleon (q.v.), whose military daring changed the map of E. He extended his rule over all Germany W. of the Rhine, a considerable part of N. Germany, and the major part of Italy: made his brother-in-law, Murat, king of Naples, his brother, Joseph, king of Spain, and another brother, Louis, king of Holland. He also placed one of his marshals, Bernadotte, upon the throne of Sweden. England remained free from invasion as a result of the naval victories of the Nile (1798) and Trafalgar (1805), and was able to keep Napoleon's ablest marshals well occupied in Spain during the Peninsular war. Prussia and Austria suffered terribly, however, and the lesser states were formed into a Confederation of the Rhine under Napoleon's patronage. Upon the weakening of his power by the disastrous Russian campaign of 1812, the vanquished nations rose into revolt and the campaigns of 1813 and 1814 determined the issue in their favour. Napoleon's escape from Elba and his brief return to imperial power only culminated in the disaster of Waterloo, and cost Ney and Murat their lives.

At the Congress of Vienna, France was reduced to the limits of 1790 and the map of E. redistributed. The Netherlands became one kingdom which lasted until 1830, when the Belgians threw off the alliance and estab. a kingdom for themselves. The Ger. states formed a loose confederacy under the presidency of Austria; Italy reverted to a number of petty states, the Venetian prov. remaining under Austrian control. Bernadotte retained the Swedish throne. The Holy Alliance formed between Russia, Austria, and Prussia for the administration of their respective kingdoms according to the principles of Christianity became the greatest factor in furthering reactionary measures and impeding the growth of constitutional liberty.

Turkish power was in decline; and in 1827 Greece recovered her freedom by the intervention of France and England. But restiveness against authority was not confined to countries with alien govs. The period 1815-48 was one in which the liberal intelligentsia, joined sometimes by sections of the aristocracy, sometimes by the growing urban middle classes,

endeavoured—usually unsuccessfully—to wrest constitutional reforms from their rulers. In England, exceptionally, considerable electoral reform was achieved in 1832. But in Europe 1848 was a year of revolution. Metternich was ousted from power, and for a brief period it seemed that a liberal united Germany might be formed; but Austrian authority was reasserted, and hopes of a liberal Germany vanished for nearly 100 years. In France the monarchy of Louis Philippe fell, and a wave of enthusiasm resulted in the nephew of the great Napoleon being elected president, and by the end of 1852 he had succeeded in becoming emperor as Napoleon III (q.v.). To retain his position he kept the nation's thoughts fixed upon foreign affairs. In 1854 he joined with England to prevent Russia from aggrandising itself at the expense of Turkey (see CRIMEAN WAR). In 1859 he helped the king of Sardinia, who had become the champion of the movement for a united Italy, in his war against Austria, and received Nice and Savoy as his reward. The victories of France and Sardinia in 1859 added Parma, Modena, and Tuscany to Sardinia, while Garibaldi's expedition of 1860 led to the further addition of Naples and Sicily. Austria, however, was still left in possession of the Venetian dominions, and the pope held the papal states. In 1863 Napoleon was induced to set up Archduke Maximilian of Austria as emperor of Mexico under Fr. protection, and the latter's capture and execution by the rebels greatly injured the Fr. emperor's prestige. In the meantime, Bismarck's Prussia had gradually forcibly ousted Austria from supremacy in Ger. affairs. The attempt of Denmark to incorporate the Ger. duchy of Schleswig into the kingdom led to the declaration of war by Prussia and Austria, and to their capture of Schleswig-Holstein. The administration of the latter soon provided Prussia with an excuse for war with Austria which was declared in 1866. The Austrians were utterly defeated, and the Italians, who had sided with Prussia, captured Venice. Hanover, which had supported Austria, was annexed to Prussia. The question of the Sp. succession in 1870 was the pretext for the Franco-Prussian war. The peace of 1871 added Alsace-Lorraine to the Ger. empire, which was formed during the course of the war under the headship of Prussia, Austria having henceforth no voice in Ger. affairs. The withdrawal of the Fr. garrison from Rome enabled the It. state to make that ancient city her cap. and seat of gov. By the Lateran Treaty (1929) the pope acquiesced in this arrangement.

From the Balkan War (1912) to the 'Armed Peace.'—During the latter years of last cent., the prin. readjustment of European ter. was in the Balkan peninsula. In 1859 the duchies of Moldavia and Wallachia were united into the kingdom of Rumania. The independence of Rumania and Serbia was recognised by the treaty of Berlin in 1878. In 1908, taking advantage of the annexation of Bosnia and

Hercegovina by Austria, Bulgaria formally asserted her independence of Turkish rule. During the autumn of 1912 an alliance was formed between Bulgaria, Greece, Serbia, and Montenegro against Turkey, and the whole of Turkey in E. captured, with the exception of a small ter. around Constantinople and the sea of Marmora. The question of apportioning the captured ter. led to a quarrel in which Bulgaria attacked Greece and Serbia, only to be forced to come to humiliating terms (see BALKAN WARS). Turkey-in-E. was now restricted practically to Constantinople, but Turkey was befriended diplomatically by the Central Powers, Germany and Austria. The div. of sympathy in the Balkans was the epitome of the state of affairs throughout E. Germany and Austria had formed a Dual Alliance (q.v.) since 1879, and in 1882 this had been extended to include Italy, forming a Triple Alliance (q.v.) of which the terms were secret. On the other side there was the Entente Cordiale (q.v.) between France and England, an agreement (1904) which settled old quarrels, leaving France a free hand in Morocco and England in Egypt. England, however, was not bound, except morally, to undertake concerted action with France against Germany or any other country. The growing distrust between the great powers has given the 1st decade of the 20th cent. the title of 'the Armed Peace.'

The First World War 1914-18.—On 28 June 1914 the Archduke Franz Ferdinand and his wife were assassinated in Sarajevo, Bosnia, by a fanatical Serb. Encouraged by Germany, Austria declared war on Serbia. Russia and France sided with the Serbs against Austria and Germany. When Germany invaded Belgium, England declared war on Germany (4 Aug. 1914). Turkey joined the Central Powers, and Japan the Allies, but Italy and Bulgaria remained neutral at first. (For a fuller account of the war, its causes and events, see WORLD WAR, FIRST, and articles on individual campaigns, personalities, etc.)

Belgian resistance was soon overcome, and the Germans advanced until checked within 52 kilometres of Paris (see FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGNS IN). In Feb. 1915 the Allies attempted to win the Balkans by an attack on Constantinople. In Mar. the naval effort to force the Narrows proved disastrous (see DARDANELLES). An attempt was then made by land (see GALLIPOLI CAMPAIGN). Italy, after being given vast territorial promises by the Allies, declared war on Austria in May 1915, but by this time the initial Russian advance in the E. was being checked by the Ger. counter-offensive, and there was no hope of Austria collapsing between a combined Russian and It. invasion. Meanwhile on the W. Front stalemate had been reached. The Gers. were able to hold their positions on the W. Front while concentrating an attack on the E. By Oct. 1915 all Poland and part of Courland and Lithuania were in Ger. hands.

Allied prestige was so low in 1915 that Germany was easily able to outbid the Allies in the effort to secure Bulgarian aid (see BULGARIA). Meanwhile, Greece's armed neutrality was becoming a menace. Serbia was rapidly overcome. By the end of Dec. the Allies abandoned their Gallipoli foothold in order to reinforce the Salonika garrison. In Jan. 1916 Montenegro was overrun by the Austrians, and in Feb. the Italians had to evacuate Albania. Simultaneously the Germans were attempting a decisive blow on the W. Front. However, a recuperated Russian army made successful advances into Galicia during the summer. At the same time, the Italians drove the Austrians back in the Trentino and Gorizia. These successes decided Rumania to enter the war on the Allied side, to be crushed almost immediately by a Ger. and Bulgarian army under Mackensen (see RUMANIAN FRONT, FIRST WORLD WAR CAMPAIGN ON). Meanwhile the Allied effort towards forcing a military decision was being made on the W. Front, and the battles of the Somme (see SOMME, BATTLE OF THE) were waged from June to Nov., battles which proved terribly costly and indecisive. On the sea Germany was endeavouring to overcome Brit. supremacy by the use of submarines, but became embroiled with neutral countries. Portugal joined the Allies in Mar. 1916. The Grand Fleets of England and Germany only encountered each other once during the war, on 31 May 1916 (see JUTLAND, BATTLE OF).

1916 ended in stalemate, with widespread depression among the Entente powers. In contrast, the Central powers were consolidated in an optimism which proved to be unfounded. President Wilson of the U.S.A. tried to mediate on the basis of 'peace proposals' submitted by Germany. Then in Feb. 1917 Ludendorff launched the unrestricted U-boat campaign, and in April 1917 America declared war on Germany.

Ludendorff and Hindenburg hoped to win the war before Amer. intervention became effective, and in the first half of 1917 the submarine warfare proved a serious menace. Moreover, the Allied offensive on the W. Front during 1917 proved the practical impossibility of piercing the Ger. lines, while Germany was relieved of a powerful enemy by the collapse of the Russian monarchy in the Mar. Revolution (see RUSSIA, History). Tsar Nicholas II was deposed, and a provisional democratic gov. was organised on 15 Mar. The revolution had been supported by the military leaders and at first it seemed that Russia would prosecute the war with renewed vigour. Kerensky organised a campaign in Galicia in June 1917 but this developed into a complete rout, and the Russians threw down their arms, refusing to fight. Russia was further disrupted by the movement towards autonomy among the Poles and Finns, the Letts of Courland, the Ruthenians in the Ukraine, the Estonians, the Lithuanians, and the Georgians of the Caucasus. The Kerensky Gov. was

finally overthrown by a Bolshevik *coup d'état*. Lenin estab. a dictatorship of the proletariat, and repudiated political democracy as it is understood in Western E. (see RUSSIA). Peace offers were at once made to Germany. Meanwhile, Finland and Lithuania had become independent reps. in Dec. 1917. The Russians agreed to the Ger. terms in Mar. 1918 (see BREST-LITOVSK, TREATY OF). Britain did not recognise the Soviet gov. until 1924, although trade relations were estab. before this. Rumania, being isolated, had signed a peace treaty with the Central Powers. In the autumn the Germans broke through the It. line on the Upper Isonzo, inflicting a crushing defeat (see CAPORETTO, BATTLE OF). But by Dec. the first drafts of Amer. troops were arriving to stiffen resistance on the W. Front. In Jan. 1918, Wilson enunciated the 'Fourteen Points' (q.v.), which were accepted as embodying the Allied war aims, and in one clause advocating the autonomy of the constituent peoples of the Dual Monarchy was spelt the doom of the Hapsburgs.

Germany was to make one more supreme effort. Ludendorff and Hindenburg planned a colossal offensive at an unexpected point on the W. Front where the Brit. and Fr. armies joined. The attack was launched on 21 Mar. 1918, against the central sector of the Allied lines between Arras and the R. Oise. The Brit. armies were rolled back, but the Germans failed in their purpose of taking Amiens. In Mar. 1918 the Germans launched a second offensive against the Fr. lines on the Aisne and the Oise. Meanwhile Amer. reinforcements were arriving in numbers, and the Italians were checking the Austrian drive on the Piave R. On 15 July 1918, the Gers. began their third and final offensive in the second battle of the Marne. Foch's counter-attack with Fr. and Amer. troops proved successful, and by Aug. the Ger. armies were in retreat.

In the near E. Foch planned a simultaneous offensive in Macedonia under Franchet d'Espèrey (q.v.) and in Syria under Allenby (q.v.). Bulgaria was put out of the war, an armistice being signed at Salonika on 30 Sept. A month later, following Allenby's successes in Syria, Turkey also signed an armistice. It. successes against Austria forced an armistice on 3 Nov., and the Dual Monarchy split up into its constituent states. Czechoslovakia emerged as a rep. and Yugoslavia as a kingdom, while on 13 Nov. Ger. Austria was proclaimed a rep. Three days later Hungary became an independent state. In Germany, Ludendorff resigned on 27 Oct. and on the following day a naval mutiny at Kiel was the beginning of a widespread socialist revolution. On 7 Nov. Bavaria became a rep. and the king fled, while 2 days later Wm II also abdicated and a rep. was estab. in Berlin. The provisional gov. under Ebert hastened to accept the Allied terms, and the Armistice was signed on 11 Nov.

Peace Conference—Treaty of Versailles, Treaty of Saint-Germain, and other peace treaties.—On 18 Jan. 1919, the Peace Conference formally opened at Paris, but the huge plenary sessions came to no decisions not already reached by the Council of Ten, which council was superseded in Mar. by the still smaller Council of Four, consisting of President Wilson, Clemenceau, Lloyd George, and Orlando. After a reorganisation of gov. Germany signed the treaty, together with all the Allied and Associated Powers, at Versailles on 28 June 1919 (see VERSAILLES, TREATY OF). In the forefront of the treaty was set the League Covenant (see COVENANT OF THE LEAGUE OF NATIONS). Although this was the result of President Wilson's idealistic purpose, he was no longer supported by the Amer. Senate, which refused to ratify the treaty. America accordingly concluded a separate peace with Germany and Austria. The treaty of Versailles was followed by the treaty of Saint-Germain, concluded with Austria on 10 Sept. 1919; of Neuilly with Bulgaria on 27 Nov. 1919; of the Trianon with Hungary on 4 June 1920; and of Sèvres with Turkey on 10 Aug. 1920. Turkey resisted the attempts which Greece made to take over the new possessions awarded at the 1919-20 Peace Conference, and a Graeco-Turkish war was only terminated by the revision in Turkey's favour of the treaty of Sèvres by the terms of the Lausanne Treaty, 24 July 1923.

Succession States—Turkey and Greece—Rise of Mussolini.—The prin. results of the peace treaties were in geographical reconstruction. The treaty of Versailles confirmed the creation of the 'succession' states of Poland, Czechoslovakia, and Yugoslavia, of Finland, and of the Baltic states of Lithuania, Latvia, and Estonia, while Danzig was made a Free City under the League of Nations. Rumania gained Bessarabia, Bukovina, and part of the Banat of Temesvar, while in 1922 the Ukraine became one of the federated States of Soviet Russia. Turkey became a rep. in Oct. 1923. In Greece, a rep. was estab. in 1924-5 but the monarchy was restored in 1935. The boundary between Italy and Yugoslavia on the E. Adriatic was one of post-war E.'s most difficult problems. In 1924 the Fiume problem was settled by the Rome agreement, whereby Fiume, although governed by Italy, should remain a free port to Yugoslavia.

The war left Italy politically unstable. The Fascist party came into being in Mar. 1919. As leader, Mussolini (q.v.) organised an armed force of irregulars, known as Black Shirts, and these were active in furthering the revolutionary strikes of 1919 and 1920. In Oct. 1922 Mussolini entered Rome in triumph, and was invited by the king to form a ministry, thus legalising his position (see FASCISM; ITALY.—History).

The Irish Free State—First Meeting of the League of Nations—Reparations.—In Britain the gov. was attempting to end the Civil war in Ireland. The Irish Free

State, created in 1921, was granted dominion status, and in 1922 a gov. was organised under Michael Collins; but the compromise remained unacceptable to the extreme Republicans and also to the Ulster Unionists (see IRELAND). Six cos. of Ulster remained part of the U.K., but with legislative autonomy.

The first meeting of the League of Nations was held at Paris on 16 Jan. 1920, with Léon Bourgeois of France as chairman (see LEAGUE OF NATIONS). European diplomacy, however, was conducted by conferences outside the sphere of the League.

The main problem 1921-4 was that of Ger. reparations (see REPARATIONS; GERMANY.—*History*; FRANCE.—*History*). Under Fr. influence the Reparations Committee in 1921 fixed Germany's reparations' debt at an impossibly high figure, disregarding Brit. warnings that all E. would suffer from the economic ruin of Germany that this ensured. In Jan. 1923, Poincaré (q.v.) ordered Fr. military occupation of the Ruhr, on the grounds that Germany's reparations were in arrears: the Ger. gov. organised 'passive resistance' to the economic demands made on the country, and galloping inflation resulted. Later, 'passive resistance' was called off, and in 1924 the currency was reformed. Meanwhile, in May 1924, Poincaré was defeated in the Fr. elections, the value of the franc having dropped by 50 per cent, and the radical Herriot (q.v.) succeeded him.

On 30 Nov. 1923 the Reparations Committee had met and inaugurated 2 committees of experts. The first committee met at Paris in Jan. 1924, under the chairmanship of Gen. Dawes (q.v.), U.S.A. representative. The purpose of the Dawes committee was to draw up a scheme of reparations and to provide for the economic recovery of Germany (see DAWES PLAN). The new Fr. gov. under Herriot accepted the scheme, consenting to a military evacuation of the Ruhr within 12 months. On 16 Aug. the London protocol recording acceptance of the Dawes plan without modification was signed by all the parties concerned. The plan was put into operation immediately.

Little Entente formed—Boundary Problems of East and Central Europe.—Affairs in E. E. centred during the years 1920-3 partly on Hungary and partly on the W. boundaries of Soviet Russia. The fear of Hungary, where until 1921, the possibility of a Hapsburg restoration remained, and also the lesser fear of Bulgaria, were countered by the formation of the Little Entente by treaties signed on 23 April and 7 June, between Czechoslovakia, Yugoslavia, and Rumania. Rumania concluded a further defensive treaty with Poland on 3 Mar. 1921, as Rumania could obtain no recognition from Soviet Russia for her possession of Bessarabia.

The various frontier problems in E. E. were settled largely through the Permanent Court of International Justice, inaugurated in Dec. 1920, but the

delimitation of the Albanian frontier led to a serious political murder. On 27 Aug. 1923, Gen. Tellini, head of an It. commission, was murdered with his companions while investigating the Gracco-Albanian frontier near Janina. The Italians then occupied Corfu. The It. action was condemned by the assembly of the League, then in its Fourth Session, but the evacuation of Corfu was only effected by the payment of a heavy Gk indemnity to Italy.

The Locarno Pact.—On 5 Oct. 1925, the conference of European statesmen opened at Locarno in Switzerland, with the object of guaranteeing the existing frontiers of both France and Germany, and so stabilising the European situation. Austen Chamberlain, chairman, and Briand represented Great Britain and France respectively, while Luther and Stresemann represented Germany, and Scialoja Italy. Belgium, Czechoslovakia, and Poland were also represented. The Locarno Pact was initiated by the delegates on 16 Oct., and the date of signature was fixed for 1 Dec., to take place in London (see LOCARNO CONFERENCE AND TREATIES). Germany was formally admitted to the League of Nations in 1926. At this point, the prestige and powers of the League seemed to be rising fast, and the prospects for continued world peace seemed good.

Disarmament.—The Kellogg Pact.—Some progress had been made in this field since Versailles. Naval disarmament was tackled at the Washington Conference (1921) and carried a stage further at the London Conference (1929). In 1927 Briand suggested a bilateral treaty with the U.S.A. for the renunciation of war; Kellogg, Amer. secretary of state made a counter suggestion for a multilateral treaty to which other states should be invited to adhere (see KELLOGG PACT). The list of signatories was imposing, but the pact was in fact meaningless except as a moral gesture.

Young Plan—Cancellation of Reparations—World Depression.—In 1929 the Young Plan for the payment of Ger. reparations came into operation, lightening the burdens previously imposed. By 1930 no foreign troops remained in Germany. By 1930-1 all European events were overshadowed by the world economic depression. Germany was practically bankrupt by 1931 and in 1932 at Lausanne the cancellation of all further reparations was formally agreed. Ger. unemployed ran into sev. million, and the political situation was so unstable that Brüning resorted to gov. by decree. The way was open for the rise to power of the National Socialists (Nazis) under Adolf Hitler (q.v.). Elsewhere in E. the outstanding event was the fall of the Bourbon monarchy in Spain and the estab. of a rep. (see SPAIN.—*History*).

Rise of the Nazis—Murder of Dollfus—Saar Plebiscite—Italian attack on Abyssinia.—The rise of Hitler's Nazi party in Germany ruined any chance of success for the Disarmament Conference which had

been sitting since 1932. By 1933 Hitler was sole dictator. Germany withdrew from the League of Nations and the Disarmament Conference (Oct.), while her hostility to Soviet Russia resulted in a *rapprochement* between that country and France. Fr. political prestige was being seriously lowered by disclosures of widespread corruption. Soviet Russia joined the League of Nations in 1934. In Austria, the Nazis murdered Chancellor Dollfuss (q.v.) in July 1934, but their attempt to seize power subsequently failed. In 1935 as a result of a plebiscite the Saar was returned to Germany. International tension in E. increased in 1935. The 'collective peace system,' goal of the League, was proving illusory in the eyes of realists. Britain had tried to set an example to the world in reducing armaments, but in doing so had allowed her own armament to become inadequate. Meanwhile, Hitler reintroduced conscription in Germany. But in England few yet dreamed of the true rate of Ger. rearmament or the predatory character of Nazi policy. Meanwhile, the principle of collective security received a rude shock in the course of the strenuous efforts made by the Brit. and Fr. govs. to prevent Italy from invading Abyssinia (1935) and it may be said that the collapse of the policy of applying economic sanctions to Italy, after the opening of the It. invasion, sealed the doom of the League as a force in the sphere of power politics. The sanctions did some economic damage to Italy without affecting the outcome of the war, and had the effect of driving Italy into Germany's arms.

The Spanish Civil War.—Civil war broke out in Spain in 1936. Britain and France resolutely followed a policy of 'non-intervention,' while Mussolini and Hitler actively supported Franco (q.v.), ostensibly in fulfilment of their common anti-communistic ideology expressed in the anti-commintern pact (q.v.) and their aid had a pronounced effect on the ultimate outcome of the war, won by Franco in 1938. The year was also marked by the successful application by Turkey to remilitarise the Dardanelles; and the grant of this cemented the good relations between Turkey and Britain.

German annexation of Austria.—*The Munich Pact.*—*German Seizure of Czechoslovakia.*—*German Invasion of Poland.*—Hitler's grip on Germany itself was now complete, and E. had a foretaste of future Ger. policy when Ger. troops marched into the demilitarised Rhineland zone in 1936. In 1938 Hitler annexed Austria in an unresisted invasion (see AUSTRIA.—*History*) and the former rep. became a prov. of the Reich. In the autumn of 1938 Hitler incited the Ger. minority in the Czech Sudetenland to demand incorporation in the Reich. Both France and Russia were bound by treaty to defend the Czechs, and Britain, though not a guarantor of Czechoslovakia's integrity, could be expected to follow France. But when the crisis came, neither France nor Britain was adequately equipped for

war. In these circumstances they yielded to Hitler and concluded the notorious Munich Pact (q.v.) on 29 Sept. 1938, which has been described as 'one of the great capitulations of history.' In spite of his Munich promises, Hitler soon overran the rest of Czechoslovakia (see CZECHOSLOVAKIA.—*History*). Britain and France protested, but did not attempt to resist Hitler. Hitler then proceeded to seize Memel (q.v.). It was in the light of these events that Britain in Mar. 1939 gave a unilateral guarantee to Poland. On 23 Aug., the world was amazed by the news of a Ger.-Russian pact. The pub. text of this Pact recorded a close agreement between the 2 Powers, adding that if either were attacked by a third, the other would give no help to the attacking Power. No one could doubt, however, that more specific bargains were covered by secret clauses, and events soon showed that these concerned the betrayal of the Baltic states, the partition of Poland, and forced concessions from Finland. After a force of ultimatums, which Poland was given no opportunity to answer, the Ger. armies invaded Poland (Sept. 1939) (for full details of the causes of the Second World War and of all immediately antecedent events, see WORLD WAR, SECOND).

HISTORY OF EUROPE DURING THE SECOND WORLD WAR (1939-45).—*German Conquest of Poland.*—The hist. of E. in the first 2 years of the war was the record of the rapid and shattering Ger. conquest of one European country after another, until Britain remained the sole defender of the liberties of mankind against a triumphant Germany holding down most of the Continent, including her fascist partner, Italy, whose unhappy people had been dragged into the war by Mussolini in the expectation of cheap and easy rewards. For the greater part of this period Stalin played the rôle of European Janus, always apparently ready to enter into formal agreements with Hitler, yet never losing an opportunity of strengthening his frontiers against him.

By the middle of Sept. Warsaw was surrounded and the Polish armies fell back on their last line of defence in the E. At this point the Soviet army crossed the frontier in their rear and Polish resistance collapsed (24 Sept.). Once again Poland was partitioned, with provision for a small puppet state under Ger. domination. In the W. of E. the Allied declaration of war was followed by a long lull—excepting at sea (see NAVAL OPERATIONS IN SECOND WORLD WAR). Russia took the opportunity to reduce the 3 small Baltic reps. to vassalage, this being presumably part of the price paid by the Reich for the Russian 'entente.' Soon afterwards Russia invaded Finland—the obvious purpose of this unprovoked onslaught being to secure her Baltic position against Ger. encroachments (see FINLAND.—*History*).

Up to the end of the spring of 1940 there were no major military developments on the W. Front. The devastating completeness of the success of Germany's

Polish campaign not only freed Germany of the nightmare of a war on 2 fronts, but it demonstrated, even more obviously than the fate of Czechoslovakia (q.v.), the reprisals small states, however 'guaranteed,' might expect at Germany's hands if they were spirited enough to offer resistance to her plans of European conquest.

German Conquest of Scandinavia, Belgium, and Holland—Collapse of France—Franco-German Armistice—Italy declares war.—Suddenly, in April 1940, Ger. forces seized a number of key points in Denmark and Norway, including both Copenhagen and Oslo. Denmark was powerless to resist, but its only outlying dependency, Iceland, was saved by being taken under the immediate protection of Great Britain. The Norwegians offered a heroic resistance under King Haakon and a Brit. expedition was hurriedly landed in Norway. But the Ger. surprise invasion was complete and their forces, landed by parachute and in troop-carrying planes, soon put them in possession of the few existing airfields. Norwegian resistance became hopeless; the king went to England and the Brit. force was re-embarked for Britain (see NORWAY AND DENMARK, GERMAN INVASION OF (1940)). This Allied defeat produced immediate repercussions in Britain and France, Churchill (q.v.) replacing Chamberlain (q.v.) as prime minister of Britain, and Paul Reynaud (q.v.) replacing Daladier (q.v.), both being pledged to the more vigorous prosecution of the war.

Without notice or declaration of war, the full fury of the Ger. war-machine was next unloosed against both Holland and Belgium, with the object of forcing a way through their ters, and turning the left flank of the Maginot Line (10 May). Holland was crushed in a few days, and King Leopold surrendered on 28 May. The Dutch royal family escaped to England. The greatest rearguard action that military hist. has ever recorded culminated in the evacuation from Dunkirk, when 335,000 men of the B.E.F. were brought home. The Gers. entered Paris on 14 June. (For the immediate effect on Britain of the collapse of the Western Front and the preparations made for the defence of Great Britain against a Ger. invasion, see GREAT BRITAIN: History.) Reynaud, who seemed prepared to carry on the fight in Fr. ter. overseas, found himself in a minority of one in his own cabinet, and a new cabinet was formed under Pétain (q.v.), which in 1941 had become so permeated by Ger. sympathisers that the 2 countries thenceforth openly collaborated against Britain. France signed an armistice with Germany on 22 June and with Italy, which country had entered the war on 11 June in the hope of securing the spoils of victory at the least cost to herself in blood and treasure, on 24 June. (For the campaign on the W. Front, see WESTERN FRONT IN SECOND WORLD WAR and for the immediate and underlying causes of the collapse of France, see FRANCE: History.)

The Fr. Fleet, on which much reliance had been placed by Britain for the protection of her Mediterranean interests, was now in danger of being handed over to Germany. Churchill promptly ordered the destruction of the Fr. fleets in Oran and Mers-el-Kebir, a number of ships being sunk or put out of action (see NAVAL OPERATIONS IN SECOND WORLD WAR).

German infiltration in the Balkans and Hungary—Tripartite Pact.—In the E. Mediterranean a large It. army under Graziani, based on Libya, was preparing to invade Egypt, while new armies suddenly advanced on Albania to invade Greece. But by the end of the year the entire It. Colonial Empire was in jeopardy through the military and naval successes of Britain and Gk arms (see AFRICA, NORTH, SECOND WORLD WAR CAMPAIGNS IN; GREECE, SECOND WORLD WAR CAMPAIGNS IN (1941); and ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGNS IN (1941)).

For the time being, Greece, aided by Brit. naval, military, and air forces, heroically resisted the invader, and indeed had Germany not taken a hand, would have driven the Italians out of Albania. Meanwhile, Hungary was admitted to the Axis (q.v.). Rumania's entire system of gov. was soon subverted by the Germans, and some Rumanian ter. was ceded to Russia. Turkey continued to declare her friendship with Britain. In Spain, Franco pursued an opportunist policy, which, when France fell, seemed likely to bring him into the war as a partner in the Axis; but he became cautious when it was seen, in the autumn (1940), that the destruction of Brit. power was still far off. Meanwhile, despite Ger. military successes, the hope of the oppressed nations of E. was reposed in Britain, who was obtaining material aid from the U.S.A. The menace of 'Hitlerism' to the New World, made obvious by the Tripartite Pact between Germany, Italy, and Japan, drew closer the bonds of sympathy between the U.S.A. and Great Britain. (See BERLIN, PACT OF.)

During the first 5 months of 1940, the Balkan States, including Turkey, were the scene of much diplomatic competition between the W. Allies, the Axis, and Russia. Rumania was forced to cede Bessarabia and N. Bukovina to Russia, whose confines now reached the Lower Danube. A pro-Ger. puppet gov. in Rumania repudiated the Anglo-Fr. guarantee and withdrew Rumania's membership of the League of Nations. Thus the Balkan Entente was at an end. Now, both Bulgaria and Hungary, undermined by Nazi sympathisers, pressed territorial demands on Rumania. With Ger. aid, Bulgaria obtained the S. Dobrudja. Britain acquiesced in the vain hope of buying off Bulgarian sympathy for the Axis. Hungary and Rumania could not agree and, on 30 Aug., It. ministers at a conference in Vienna dictated a settlement which cost Rumania over half of Transylvania. This betrayal

resulted in the abdication of King Carol (6 Sept.) and the entry of Ger. troops. Rumania was now virtually a Ger. protectorate.

Nazi persecutions in occupied countries.—Under German occupation, the countries of E. suffered privations and hardships in varying degree. There was a general shortage of food and a denial of elementary civil rights and liberties; acts of extreme brutality were carried out, sometimes, as in Czechoslovakia and Poland (and later in Yugoslavia and Russia), on a vast scale. In Germany itself persecution of certain racial and political groups had been a feature of Nazism since its earliest years in power.

German Conquest of the Balkans.—In the hope of forestalling a Ger. invasion of Greece, Eden, Brit. foreign secretary, visited the Balkans in an effort to organise a Balkan bloc of resistance. To counteract this, the Germans hastily occupied Bulgaria, 'invited' Yugoslavia to join the Axis, and gave 'friendly' advice to Greece to conclude peace with Italy. The Yugoslavs rose in revolt against their pro-Axis rulers and prepared to fight the Germans, but the country was overrun in a few days. This was followed by the Ger. conquest of Greece and Crete after fierce resistance by Gk and Brit. troops against overwhelming odds (see GREECE, SECOND WORLD WAR CAMPAIGN in (1941)). Greece was later ceded to Italy as a political sop.

German Invasion of Russia—Anglo-Russian Alliance.—With the conquest of the Balkans, all W. Europe was conquered or effectively neutralised—with the exception of Britain. Hitler's attack on Russia now could be launched without fear of direct allied intervention. On 22 June the Germans began their offensive along the whole Russian frontier.

The Germans launched 3 major attacks: in Lithuania so as to menace Leningrad; in Poland from Brest-Litovsk against Grodno and Vilna, so as to menace Moscow; and in Bessarabia, by combined Germano-Rumanian forces, across the Pruth, aimed against the Ukraine. Soon afterwards, further attacks developed in White Russia, particularly around Minsk, in Finland, and around Murmansk (for this campaign, see EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS in SECOND WORLD WAR). The Baltic states were soon largely overrun, and in E. Poland the Germans advanced a considerable distance. But from the beginning they met with unexpectedly strong resistance from the Red Army, and gradually it seemed evident the Russians would hold their own. On 12 July the Brit. and Soviet govts. signed a formal agreement undertaking to render each other all assistance in the war, and to negotiate no armistice or treaty of peace except by mutual consent.

Russo-Polish Agreement (July 1941)—Alked guarantee to Turkey.—The overrunning of E. Poland by the Germans brought into sharp relief the political relations between the Poles and the Soviet Gov. On July 30 the Soviet Gov. and

Gen. Sikorski, Polish prime minister, concluded an agreement by which the Soviet-Ger. Treaty of 1939 regarding territorial changes was declared void. The 2 govts. agreed to render each other mutual aid of all kinds in the war. The delimitation of the new frontiers was, however, left over until the end of the war. Shortly after this agreement, the Brit. and Soviet govts. made a joint declaration in Ankara guaranteeing help to Turkey if she were attacked by a European power and renewing pledges to respect the territorial integrity of Turkey and the Montreux Convention of 1936 regarding the Straits.

The Atlantic Charter.—Germany's diplomatic situation had deteriorated since the heyday of her military successes in Greece and Crete. Held up in her giant thrusts at Leningrad, Moscow, and Kiev, Germany was more than ever anxious to create a diversion which should prevent Britain from fully concerting her strategy with Russia. Towards the middle of Aug. 1941 it was generally believed that Germany intended to put forward 'peace' proposals, designed to perpetuate Hitler's 'New Order' and, above all, to accentuate the split in America between the pro-Ally public and the isolationists. But this move was forestalled by an historic meeting at sea on Roosevelt's (q.v.) invitation between the President and Churchill, the outcome of which was a joint statement of principles on the national policies of their respective countries on which they based their hopes for a better future for the world—a remarkable manifesto and entirely without precedent or parallel, for it was in effect a pact between a belligerent and a non-belligerent (see ATLANTIC CHARTER).

The outbreak of war on the E. front changed the whole aspect of European and world affairs. On the Axis side troops from the subject countries of Hungary, Rumania, and even Italy were soon thrown into the struggle. Finland, resenting its defeat in 1939-40, was soon induced to co-operate in the invasion of Russia. Later, in response to Russian requests, Britain declared war on these Ger. satellite countries. But for geographical reasons the help which Britain might render Russia could only be in the form of munitions of war and even then delivery involved hazardous convoy operations in the Arctic. The entry of Russia into the war brought new hope to the defeated nations. The spirit of revolt in France expressed itself in sporadic acts of violence, followed by ferocious reprisals by the occupying Germans. Meanwhile the tide had turned in Russia. The Russian winter fell with devastating effect on the ill-protected rank and file of the invading armies. The misery of the Ger. soldiers in the intense cold could not be concealed from the Ger. people, and the situation became so aggravated that Hitler tried to restore confidence by assuming personal command of the Ger. armies. Greater help was, however, forthcoming for the Axis from the Far E. when the treacherous

Jap. attack on Pearl Harbour brought America into the war overnight. Though the year ended with heavy territorial losses for the Allies in the Far E. theatre of war, in Europe and N. Africa, on the other hand, the legend of Nazi invincibility had been shattered for ever. The new alliance, disposing ultimately of resources far transcending those of the Axis, had been firmly estab., though a long period of effort, more intense than any yet undertaken, had to be faced before the decisive strength of the grand alliance could be made effective.

German Spring Campaign of 1942—Defence of Stalingrad.—The Russian counter-offensive which had relieved the gloom of Dec. 1941, was brought to an end by the Jan. frosts, and left the Germans to resume preparations for the spring campaign. Heavy disasters befell the Allies in the Far E. and further threats there were fast developing. Yet the real key to the situation was the control of Africa and the Mediterranean, in which sea the garrison of Malta alone kept the Brit. flag flying in what had become almost an Axis-controlled *mare clausum*. When the expected Ger. offensive on the E. Front came, it proved to be concentrated on the S. sectors, beginning with the Crimea. Fierce protracted battles were fought and Sebastopol fell 1 July. Rostov surrendered on 28 Aug. The Russians therefore decided to withdraw from the whole huge industrial area comprised within the loop of the Don. The Gers. having captured Rostov, hastened to exploit their success in 2 directions: 1 great army wheeled right to invade the Caucasian passes through which they hoped to march before winter and so reach the Caspian Sea and the oilfields of Baku; another army advanced straight forward to cut the chief remaining lifeline of the Soviet, the Volga. But at this critical juncture the Russian resistance buttressed itself upon the steel city of Stalingrad, at the point of the Volga nearest to the Don; and by the heroic endurance of the garrison and people of that fortress, continued over several weeks, gradually fought the invaders to a standstill.

The autumn of 1942 may be regarded as the dividing line in the calendar of the war. Both sides knew that the initiative of the Axis in grand strategy was spent at last and that with their increasing resources the Allies would soon be in a position to attack. The Ger. leaders indeed tacitly acknowledged this governing fact in their public utterances, and their purpose now was to convert E. into an impregnable Ger. fortress, capable of resisting an indefinite siege until war-weariness or internal dissension should cause the allies to give up their efforts to reduce it. It was at this time (23 Oct.) that Alexander (q.v.) launched the Eighth Army (q.v.) to the attack on the Axis positions at El Alamein. The Ger. and It. armies were driven out of N. Africa or captured and the way opened for the invasion of Italy in the following year.

This was achieved partly through the victory of El Alamein and partly by the surprise landing of an army of Brit. and Amer. troops at key points of Algiers and Morocco. The response of the Axis to these events was to man the battlements of the threatened fortress of E. The Ger. army marched into the unoccupied zone of France, the Fr. navy scuttling their ships rather than surrender them to the enemy; and the Italians were permitted to occupy parts of SE. France. On the Russian front a severe check was administered to the Wehrmacht in the Caucasus in Nov.; while 2 days later an impressive counter-offensive began in front of Stalingrad, and before long a Ger. army of 300,000 men was completely encircled.

Casablanca Conference—German Sixth Army annihilated by the Red Army.—11 Jan. 1943 Roosevelt and Churchill, with their military advisers, met at Casablanca to plan the conduct of the war by a more closely integrated effort. The immediate objective for 1943 was to eliminate Italy from the war. This programme was duly executed, and indeed Allied successes came more quickly than was foreseen at Casablanca, the chief factor being the remarkable Russian victories. On 1 Jan the Russians captured Veliki Luki, broke the Ger. lines of investment before Leningrad, and brought about the surrender of the remnants of the Ger. Sixth Army. The Ger. army in the Caucasus was falling back towards the lower Don. The recapture of Rostov on 14 Feb. marked the liberation of the main Caucasian area, and throughout Jan.-Feb. many cities in the Donetz Basin and the Ukraine were successfully delivered.

Allied Invasion of Sicily—French Fleet joins the Allies—Collapse of Italian resistance—German retreat from Donetz Basin.—By 13 May the Axis had lost its last foothold in N. Africa with the surrender of their forces in Tunisia and the Allies prepared to cross the Mediterranean and complete the overthrow of Italy. On 31 May the Fr. fleet at Alexandria, which had been neutralised since 1940, joined the Allied navies.

The fact that in the Far E. the Jap. were everywhere held meant that the largest possible forces could be committed in E. for the reduction of Axis forces and resources. In the Mediterranean the Allies launched their invasion on the S. corner of Sicily by an amphibious operation on an unprecedented scale. In July the Fascist Grand Council met and deposed Mussolini, and an emergency gov. under Badoglio dissolved the Fascist Party and sent overtures of peace to the Brit. Gov. Meanwhile the invasion of the It. mainland had begun, and on the day (3 Sept.) that the Brit. Eighth Army entered Calabria, Badoglio's envoys had secretly given in their 'unconditional surrender'—as required by the Casablanca declaration. This heavy blow to the Germans, who thenceforth had to garrison with their own resources, not only

the It. mainland but the great Balkan regions hitherto garrisoned by It. troops, came in the midst of a disastrous campaign on the E. Front. In previous years the summer fighting had always favoured the Ger. arms; this time the tables were turned when the Germans, striking against the great Russian salient at Kursk, were held and then hurled back with great losses by a powerful Russian counter-offensive. On 6 Nov. the Russians retook Kiev and speedily developed a vast salient, in the process cutting the most important lines of lateral communication left to the Germans on Russian soil. When the frosts descended on the N. half of the front the Russians opened their winter campaign with a deep penetration near Nevel. By Christmas the Ger. counter-offensive, for which they had concentrated the greater part of their armoured strength, was exhausted, and the Russian forces under Gen. Vatutin (q.v.) struck back from the S. of the salient in a powerful counter-thrust.

The surrender of Italy was made public on 8 Sept. simultaneously with fresh Allied landings near Salerno. By 1 Oct. Naples had fallen, though the road to Rome remained barred till the summer of the following year. In Corsica and Sardinia native co-operation was instrumental in driving out the Germans, but an Allied expedition to take the Dodecanese Is. was overwhelmed by a swift Ger. counterstroke. In the Balkans, however, the It. surrender gave greater scope to the partisan forces of the enslaved countries, though in both Yugoslavia and Greece their exploits were to some extent discounted by dissensions amongst themselves or with their exiled govts.

United Nations Relief and Rehabilitation Administration.—With so many signs of ultimate victory and its concomitant anxieties and responsibilities, there was a growing concentration of thought upon the problems of future reconstruction. For shorter term problems of liberated E. there was set up the United Nations Relief and Rehabilitation Administration (U.N.R.R.A.); and a corps of administrators (Civil Affairs) was formed, under military responsibility, to provide for the military gov. of enemy ter. and initial civil gov. of liberated ter. As to permanent machinery to replace the League of Nations Covenant, the 4 great Powers recognised 'the necessity of establishing at the earliest practicable date a general international organisation, based on the principle of the sovereign equality of all peace-loving States, large or small, for the maintenance of international peace and security' (see *further under UNITED NATIONS, CHARTER OF THE*). 2 other declarations made at the conference of the 4 foreign ministers of France, Britain, Russia, and the U.S.A. at Moscow (Oct.) dealt directly with Germany; one announced plans for the trial of Ger. war criminals, while the other favoured the re-establishment of an independent Austria. (see *CRIMES, WAR; NUREMBERG TRIAL*). Other conferences followed including a

meeting at Teheran between Roosevelt, Churchill, and Stalin who issued a manifesto declaring that the Ger. forces would be destroyed by operations of agreed scope and timing from E., W., and S., and accepting responsibility for a peace that would 'banish the scourge and terror of war for many generations.'

Red Army clears the Crimea.—*Rome taken by the Allies.*—The year 1944 found the Allies at last deployed in their full military might. The assumption in Jan. by Eisenhower (q.v.) of the supreme command of the allied forces concentrated for the invasion of western E. heralded the outstanding military enterprise of the year. But meanwhile the main offensive power remained with the Red Army, while to the Eighth and Fifth Allied Armies in Italy was assigned the duty of checking the powerful Ger. force of Kesselring (q.v.) S. of Rome. In Mar. the Russian armies in the Ukraine swept over the riv. barriers in the S. half of the front and crossed into Rumania, threatening the Danube basin. The Crimea was cleared in May, and Sebastopol recovered. In the N. a new offensive against Finland pierced the Mannerheim Line (June), by which time the focus of strategic interest had shifted to France. Meanwhile the deadlock in Italy was resolved by sea-power which covered a new landing at the Anzio-Nettuno beaches. In spite of heavy losses the invading troops held firm on the beaches while the forces on the main front broke through the Gustav Line and effected a junction with them. Thus the Ger. flank was turned and the road opened to Rome, which fell on 4 June.

Allied Invasion of Normandy.—*Political reactions in Germany.*—The immense and hazardous amphibious operation of landing on the coast of Normandy was begun on the morning of 6 June, the culmination of months of intensive but hidden activity in Britain and America and on the Atlantic seaways, directed to the marshalling and equipment of the greatest army of invasion ever launched overseas against a hostile shore. The hub of the great battle of Normandy was a tactically defensive position covering Cuen, which was taken on 9 July, and thereafter for sev. weeks the most dangerous hostile striking force was pinned down to an almost static battle. But after Cherbourg fell (26 June) and the Amer. armies turned S. again to break through the Ger. lines at St Lô and sweep out into Brittany, there followed a rapid and dramatic transformation of the whole aspect of the campaign. While the Brit. and Canadians held the enemy before Caen, the Amers. turned eastward again and advanced through Angou and Maine and so threatened to take the enemy's great panzer army in the flank. The Ger. commander, Rommel (q.v.), now tried to evade the trap by a bold counter-offensive aimed at the hinge of the Amer. wheel at Avranches. His failure led to the headlong retreat of the entire Ger. army, and a substantial part of it was destroyed at the Falaise Gap. (see *WESTERN FRONT IN*

SECOND WORLD WAR), the remainder retreating to the Seine and across the riv. after destroying most of the bridges. In the vain effort to sustain the defence of Normandy S. France was denuded of first-line Ger. troops and a landing, based on Italy, was easily effected by a new Allied army which quickly captured Toulon and Marseilles and advanced up the Rhône valley. Its progress was effectively assisted by men of the Fr. *maquis* (or partisans). Paris was liberated on 25 Aug. A provisional gov. was at once set up under Gen. de Gaulle (q.v.). On the left of the line the continued pursuit of the retreating Germans soon brought the Brit. and Canadians into Brussels, and most of Belgium and part of Holland were freed by the early autumn.

The political reactions of these heavy defeats in Germany were profound. An important section of the military caste attempted to overthrow the leaders whose policy and strategy had led to these disasters, while an abortive attempt on Hitler's life on 20 June was followed by a ruthless purge in the course of which many officers were executed. The morale of the Ger. people at this critical time seems to have been sustained mainly by the vain hope of destroying their foe in England by the aid of 'secret weapons' such as flying bombs (q.v.) and rockets (q.v.) which caused considerable destruction of civil life and property in S.E. England and Belgium, but had only negligible effect on the war effort.

Red Army's Summer Offensive of 1944—Russians conquer Rumania—German retreat up the Danube—Red Army invests Budapest.—At the end of June the Red Army opened their summer offensive. In the centre of the front they quickly overran all E. Poland and approached the Vistula, at which moment the underground forces in Warsaw, vainly anticipating the relief of the city by the Russians, rose prematurely against the Germans only to be crushed after a heroic resistance of sev. weeks. The incident embittered the already strained relations between Russia and Poland, arising out of the Russian claim to retain the provs. seized from Poland in 1939. Further N. the Russian armies forced their way through Lithuania to the mouth of the Niemen, and Riga fell to them on 13 Oct. Finland signed an armistice at the end of Sept.

On the S. half of the E. front the Russian advance was now resumed, both over the Carpathian passes and up the Danube valley. Rumania then sued for peace and re-entered the war on the side of the Allies. Bulgaria, thus isolated, also submitted to the Allies' terms. These defections not only forced the Germans to a hasty retreat up the Danube, but imperilled their armies of occupation in Yugoslavia and Greece, which now began a hazardous withdrawal, continually harassed by Tito's partisans who had now grown into a formidable army. Mainly by the efforts of the Gk guerrilla bands, Greece was completely liberated by the autumn. The Red Army pushed on into central E., con-

verging upon Hungary by way of the Danube and over the Transylvanian Mts and entered Budapest on Christmas Day.

The campaign on the W. Front now seemed stationary compared with the mobile conditions of the summer, but the methodical massing of force opposite the Siegfried Line (q.v.) still involved hard fighting. The main battles were brought about by operations to extend the Allied grip on the classic gateways to Germany—the gaps of Belfort, the Saar, and Aachen. The last-named city, the first major city of Germany to fall to the Allies (21 Oct.), thus became the seat of the first experiment in the civil administration of hostile ter.

Post-war problems of liberated countries of Europe—Interneecine strife in Greece.—From the time of the landing in France an over sanguine sense of the imminence of complete victory in E. pervaded the public mind, which naturally became ever more interested in post-war problems, and in some of the countries suddenly liberated from Ger. tyranny the difficulties of transition were only too evident. In Greece a civil war broke out which was to rage for sev. years.

Failure of von Runstedt's Counter-offensive in the Ardennes—Red Army on the Oder—Yalta Conference—Allied Advance across the Rhine—Conquest of East Prussia—Fall of Berlin.—In Dec. von Runstedt (q.v.), the Ger. commander-in-chief, made bold attempts to restore Ger. fortunes by a powerful thrust through the Ardennes (see WESTERN FRONT IN SECOND WORLD WAR); but at the turn of the year the Allies launched a counter-attack which threw the Germans back on the defensive. The failure of this ambitious offensive proved strategically disastrous to the Ger. commander, for his enterprise had necessitated fighting the decisive battle of the campaign W. of the Rhine and made it certain that he would not have the strength for a protracted defence after the riv. was crossed. In the E., by the middle of Jan. 1945, the main Russian line was sweeping irresistibly over the frozen plain of Poland and up to the Oder opposite Berlin by the beginning of Feb. Here there was a pause; but meanwhile other Russian forces occupied Budapest (13 Feb.) and pressed on into Austria. A thrust towards the mouth of the Oder cut off E. Prussia, which was now gradually reduced in bitter fighting. The resumption of the advance from the middle Oder brought the Russian armies into the suburbs of Berlin in mid-April, and S. of the capital mobile detachments broke through the enfeebled resistance to the banks of the Elbe. While this last great surge of the Red Army was in its initial stages, Churchill, Roosevelt, and Stalin held a conference at Yalta (q.v.) in the Crimea to co-ordinate allied policy and administration after the subjugation of Germany which all might see to be imminent. The Conference had not ended when on Feb. 8 the Battle for the Rhine opened with a strong Brit. offensive in Holland, which towards the end of the

month developed into a general attack all along the line. As soon as the exploitation of the bridgeheads won on the Rhine began it was obvious that Germany's doom was at hand. Field-Marshal Montgomery (q.v.) swung northward to complete the liberation of Holland and to drive the confused mass of the German right towards Schleswig-Holstein. At the same time the Amer. armies encircled the Ruhr area and then penetrated far into Central Germany beyond that great industrial region. The Amer. Third Army drove on irresistibly under its meteoric commander, Gen. Patton (q.v.), into Bavaria and to the Austrian frontier, while the Fr. army advanced to the Swiss border from the N. In E. Prussia the Russian avalanche engulfed in its train numerous cities and strongholds. With the surrender of Königsberg (9 April) the whole of E. Prussia (q.v.) was overrun. Vienna was taken on 13 April and, on 2 May, after a devastating bombardment, which completed the destruction previously wrought by Allied bombers, the surviving Nazi leaders in the city surrendered the blazing ruins of the Reich. The final disruption of the Nazi and Fascist hierarchies of E. was precipitated in Italy by Field-Marshal Alexander's forces, which, in 3 weeks, broke Kesselring's formidable position on the Bologna line.

Final Offensive in Italy—Germany's Unconditional Surrender.—The final offensive in Italy was launched on 9 April and within a few days the Allies crossed the Po at a number of points and a Ger. collapse followed. On 29 April all the Ger. forces here and in Austria surrendered. The previous day the fugitive ex-dictator, Mussolini, was caught and lynched by It. partisans near Milan. Hitler probably perished in the ruins of his chancellery, though the precise circumstances of his end cannot be estab. with absolute certainty. Doenitz (q.v.), the naval commander-in-chief, now arrogated to himself *pro tem.* the supreme power and was allowed by the Allies to sign in that capacity the act of unconditional surrender to the United Nations generally (29 April), the final submission being made at Rheims on 7 May.

Atrocities of incredible horror had been revealed as the Allied forces overran the concentration camps (q.v. and see AUSCHWITZ, BELSEN, BUCHENWALD, etc.) of Germany and a beginning was made with the trial and punishment of those immediately responsible. A more solemn act of high justice was inaugurated at Nuremberg, previously the H.Q. of National Socialism (q.v.), where the apprehended chiefs of the party were arraigned before an international tribunal on an indictment charging them with war crimes (q.v. and see also NUREMBERG TRIAL).

Reconstruction Measures—Problem of Displaced Persons—Political reconstruction.—The material and spiritual ravage in E. was only too conspicuous, and a joint responsibility for the reconstruction of the continent rested primarily on Great

Britain, Russia, and America; but the prospect of the continuous application of a concerted policy was prejudiced by the fact that the reconstruction proceeded in 2 zones dominated respectively by Anglo-American and Russian influence. Germany and Austria were partitioned for administration between the 2 groups of Powers, the frontier being defined by the Elbe and a continuation southward, and the Western half being subdivided between Brit., Amer., and Fr. zones. Central Control Commissions in Berlin and Vienna were appointed to co-ordinate these sev. administrations. A problem of grave dimensions confronted all by the swollen flux and reflux of millions of displaced persons. On the E. side of Germany, Russian influence remained strong in the tens. that had been occupied by Russian troops in the course of the war. A part of former E. Poland was annexed by the Soviet Union, compensation being given by extending the Polish frontier at the expense of Germany, to the Oder. For this new Poland the Russians had nominated a gov. which they set up in Warsaw when they captured the city (Jan.) and this gov., slightly reconstructed, was recognised by Great Britain and America in place of the exiled gov. which had maintained its continuous existence in London. Bulgaria and Rumania were settled under coalition govts. friendly to Moscow; in Yugoslavia the victorious Tito (q.v.) was acclaimed by an overwhelming majority of electors, the exiled young king being deposed and a republic inaugurated. In Hungary a general election gave the Small-holders a large majority over the Communists. Czechoslovakia settled down under a gov. of progressive views to a programme of reconstruction which included the nationalisation of about 1000 large industrial concerns. In Austria, as in Germany, the country was divided into 4 zones of occupation, elections giving the Catholic People's party a majority. In Western E. the transition from war and foreign occupation to peace and freedom was less difficult than elsewhere. Political equilibrium was secured for a time in France under de Gaulle, though economic recovery was hampered by a gravely damaged transport system and lack of supplies. In Belgium an issue which threatened to split the country was the projected return of King Leopold. Ultimately the regency was continued for some years while he remained abroad. By contrast the queen of the Netherlands and the king of Norway, both of whom had resolutely sustained the long struggle were welcomed back by their subjects with popular acclaim. Denmark, where also the monarchy emerged with great credit, returned fruitfully to the works of peace. In Russia the losses in life and treasure during the war were on a scale so vast as to subject the national resources both material and moral, to the heaviest strain. On the fields of battle lay sev. million Russian dead. A new and characteristic 5-year plan was promptly

announced. The loss of 6,000,000 destroyed houses had to be made good and 25,000,000 displaced persons had to be settled and cared for. Russia was to be the chief beneficiary of the reparations to be demanded of Germany. Under the Potsdam Agreement the Allies were bound to restore local self-gov. in Germany and to introduce elective representative principles into the administration. The agreement in fact provided that the administration of affairs of Germany should be directed to the decentralisation of the political structure and the development of local responsibility. It was not intended to prevent progress towards a central gov. with powers necessary to deal with matters which might properly be dealt with on a nation-wide basis; but it was intended to prevent the estab. for the time being of a strong central gov. dominating the Ger. people instead of being responsible to their democratic will. These explicit agreements, signed by Stalin among others, were not honoured when the time came to implement them, and, in particular, the execution of the agreement that Germany should be treated as an economic unit was met on the Russian side by a blank refusal (see further POTS DAM AGREEMENT).

Conflicting ideologies in resettlement of Europe and discussion of Peace treaties.—The W. Powers being in control of half E. and Russia of the other half, the resettlement of the whole was organised on unrelated lines. Across the line of demarcation there was little economic intercourse and from the E. side little communication of intelligence. All gov. beyond the so-called 'iron-curtain' were either members of the Soviet Union or soon wholly subject to its influence. In Greece the continued presence of Brit. troops probably saved the country from Communism, and in 1946 the king returned to Athens. In all the Balkan countries, excepting Albania and Yugoslavia, stabilisation of political regimes was marked by the holding of elections. The year passed in Poland without the gov. holding the free elections to which it had pledged itself. Meanwhile the allied countries in the W. of E. restored and reconstructed their political systems upon lines of parliamentary self-gov. Of all the allied countries France had most difficulty in finding a political *modus vivendi* for the post-war period. The Fourth Republic came into being in Oct. 1946, but elections gave no overall majority to any party, and after the retirement of de Gaulle from the country's leadership, gov. followed gov. with monotonous frequency, small pressure groups being able to overthrow the ministry of the day without much difficulty, though gov. has shown slightly more stability since 1954. Italy became a rep. (1946) with a Christian Democrat gov.

E. being thus divided, the settlement of terms of peace seemed to resolve itself largely into a diplomatic trial of strength for the adjustment of frontiers between

the rival systems. After more than 20 weeks of discussion, first in Paris and then in New York, the Council of Foreign Ministers completed (Dec.) the 5 treaties with Germany's former satellite states in E. Italy, Bulgaria, Finland, Rumania, and Hungary. A few days later the Council decided to meet in Moscow on 10 Mar. 1947, to try to devise a common policy in Germany and Austria. Throughout the year Hevin (q.v.) and Byrnes (U.S.A.) made strenuous efforts to establish 4-Power agreement on Germany, but the discussion within the Council of Foreign Ministers only served to emphasise the differences.

In Germany and Austria administration and disarmament had been based by the Potsdam Agreement upon the close co-operation between the 4 Powers—Britain, Russia, U.S.A., and France. This agreement of Aug. 1945 remained throughout 1946 the charter of Allied control, and though much of it was increasingly less observed and applied no attempt was made to revise it. As one consequence of it there arrived in the W. zones of Germany during 1946 nearly 4,000,000 Gers. expelled from Poland, Hungary, and Czechoslovakia. Over 2,000,000 were scheduled to enter the Russian zone. But in one great matter co-operation was real. The state trial of the principal Ger. leaders for high crimes and misdemeanours against humanity and international law was carried to a conclusion and a number of the accused put to death by judgment of a tribunal representative of the 4 Powers. In administration, however, there was no such measure of agreement. No Ger. agency able to act in Germany as a whole came into being. Greater unity began to develop between the Brit. and Amer. zones, but throughout 1946 E. and W. Germany drifted further apart. The division of E. between opposed political and social systems was responsible for cutting Germany in two.

Russian intransigence.—The 'Iron Curtain.'—Although the League of Nations had now been formally dissolved (31 July nothing in the events of 1947 suggested that its successor, the U.N., had any substantial prospect of realising the dreams of promoting universal peace on which the League had been founded after the First World War. A common policy of the Great Powers, which was its condition precedent, grew steadily more improbable, and consequently the proceedings of the Security Council and the Assembly (see UNITED NATIONS, CHARTER OF THE) were generally felt to be far less significant for the dominant issues than the meetings, albeit inconclusive, between the representatives of the U.S.A., and those of Great Britain, Russia, and France. Unhappily, as the year wore on, Russia became progressively more and more flagrantly ranged in opposition to the other three. This intransigence of Russia was, in fact, the decisive feature of European hist. after the war. The signing of peace treaties with Italy, and the lesser European satellites of Germany, did little to solve the

deadlock. The Soviet Union concentrated on consolidating its relations with and influence over all nations—except Greece and Turkey—E. of the line of div. estab. at the time of the Ger. surrender. Under Russian influence all these countries were by 1948 ruled by single-party totalitarian régimes. Rigid control of communications prevented W. E. from learning very much of what was happening behind the so-called 'iron curtain,' while those within the Soviet Union were yet more ignorant of the conditions of the W. In W. E. a fierce struggle for power raged between the Communist parties, largely following the direction of Russian policy, and other political groups. The background to the conflict was the economic misery and chaos of a continent threatened with starvation and bankruptcy.

Marshall Plan—Russian Counter-moves.—It was evident that nothing could avert these evils from occurring in the not very distant future, and, at the same time, offer a prospect of ultimate recovery to European autarchy except the importation of vast supplies from the New World. Accordingly Marshall (q.v.), the secretary of state, in a speech at Harvard (5 June) outlined his plan to come to the rescue of E. with financial help on a gigantic scale. The condition of assistance was that the European nations should meet and submit a combined statement of their needs and that the aid would be granted only for recovery and as part of a system of mutual aid; but when a conference with this object assembled in Paris, the Soviet Union persuaded their satellite states not to participate. The W. peoples (16 nations) submitted their proposals in a general report giving details of a 4-year programme of reconstruction and at the end of the year the U.S.A. Gov. recommended the enormous figure of 17,000 million dollars.

In every aspect the political and still more the economic instability of E. was intimately related to the uncertainty over the place that Germany was eventually to take in the Continental system. In Germany little now remained of the Potsdam provisions after the Brit. and Amer. govts., forced to counteract the exclusive policy in the Soviet zone, formed their own economic state out of their combined zones.

The 'Cold War' between the Western Powers and Russia—The 'Western Union.'—The hist. of E. in 1948 is the hist. of the struggle between Russia and the W. world, when the div. between E. and W. became more sharply defined, with both sides in the 'cold war' endeavouring to consolidate the forces under their control. In the House of Commons (22 Jan.) Ernest Bevin (q.v.), Brit. foreign minister, put forward the idea of a 'Western Union' or voluntary association of the govts. of Britain, France, and the three 'Benelux' countries to deal with practical economic and military problems. Meanwhile Russia consolidated the countries of E. E. in a solid Communist bloc.

Russian Coup d'État in Prague—Treaty

of Brussels.—The Czech Communist party, openly supported by Russia, carried out a *coup d'état* in Prague as the result of which a Communist-dominated gov. took office and civil liberties were destroyed. In Yugoslavia, however, Tito refused to submit to Russian orders, and boldly maintained his position. Yugoslavia being expelled from the Cominform (q.v.). On 4 Mar., the Brit., Fr., and Benelux govts. representatives met in Brussels to form a W. Union and, on 17 Mar., the treaty of Brussels (q.v.) was signed, pledging the signatories to close co-operation in economic matters and to give immediate military assistance if any of them should be the object of armed attack in E. The 5 govts. also agreed to set up a permanent consultative council to meet in London. Meanwhile the European recovery programme, which had been made possible by Marshall's offer of aid the previous year, made steady progress, and on 3 April Truman signed the Foreign Assistance Act authorising aid to E. for 1 year. When this act was signed the 16 European nations which had accepted the Marshall offer met again in Paris to set up a joint organisation for European Economic Co-operation (O.E.E.C.) which was intended to outlive the European Recovery Programme and which is still (1957) functioning.

A divided Germany—Blockade of Berlin.—Meanwhile the problem of Germany—and to a lesser extent of Austria—became more urgent and menacing. In Feb. the Brit., Fr., and U.S.A. Govs. began discussions in London about the future of the 3 W. zones of Germany. These discussions, in which the Benelux countries later joined, finally resulted in a 6-Power agreement which was pub. on 7 June providing for the election of a provisional Ger. Gov. in the W. zones 'until the eventual establishment of German unity.' In June the Russians banned traffic between their zone and the W., and on 19 June the blockade of Berlin began—the W. Powers imposing restrictions on trade as a countermove. A disagreement on Ger. currency reform was the Russian pretext for this move, but the blockade was in reality a deliberate attempt to force the W. Powers either to abandon their plan for W. Germany or to leave Berlin. Unable to supply the pop. of their sectors with food and other supplies by road or rail the W. Powers arranged to supply them by air, and carried this through successfully throughout the autumn. The div. of Germany, of Berlin itself, was accentuated when separate city councils were elected in the Allied and Russian zones of the city—the Russian elections being carried out in the usual Communist one-list manner. While the blockade continued, the W. Powers were forced to concentrate on restoring the W. zones to a state of political and economic health and in this they were helped by the success of their currency reform which so stimulated Ger. production that by the end of 1948 the output of coal, steel, and consumer goods was

approaching the 1936 level. A constituent assembly met at Bonn on 1 Sept. to adopt a constitution or basic law. The Brit. and Amer. military commanders in Germany announced that the coal and steel industries would be handed back to Ger. trustees under allied supervision until a Ger. gov., elected by the people, could decide their future ownership.

European Recovery.—Meanwhile, under the stimulus of generous Amer. aid, W. Europe made speedy progress towards economic recovery, though the problem of the 'dollar gap' was to remain with the sterling area long after apparent economic recovery had been obtained.

Council of Europe.—The Consultative Council of the W. Union, consisting of the foreign ministers of the 5 W. Powers met in London on 27-28 Jan. when they agreed on the creation of a council of E. (q.v.) consisting of a ministerial committee meeting in private and a consultative body meeting in public. The Council decided to invite other European countries to take part in negotiations for the estab. of the Council of E. The defence organisation of the W. Union began to take shape when the defence ministers of the 5 powers met in Paris (Sept. 1948) and the nucleus of a joint command was set up.

North Atlantic Pact.—Meanwhile negotiations had been in progress for the conclusion of a N. Atlantic Pact in which the U.S.A. should be associated with W. E. in security arrangements. The draft pact of treaty was completed in Mar. 1949. Its principal Article (V.) recognised that any aggression against one of the signatories would be considered as an aggression against all. In those circumstances immediate action against aggression, either individually or collectively, and by armed forces, is contemplated by the pact. The pact was signed on 4 April 1949 by the U.S.A., Canada, Great Britain, France, Belgium, Holland, and Luxembourg. Norway, Italy, and Denmark were invited to adhere later, and, in a still later stage, Portugal, Iceland, Greece, Turkey, and W. Germany (see supra).

Berlin blockade lifted.—End of Greek Civil War.—In May 1949 the Russians lifted the Berlin blockade. Throughout 1949 Russia seemed to relax her efforts in the 'cold war,' concentrating, instead, on strengthening her grip on the satellite nations of E. Europe. In Hungary, for example, the Primate, Cardinal Mindszenty (q.v.) was in Feb. sentenced to life imprisonment on charges of treason; in Poland a Polish-born Russian gen., Rokossovsky, became defence minister. The satellites followed Russia's lead in breaking off relations with Tito's Yugoslavia and exerting all possible economic pressure on her, in an attempt to break Tito's resistance; but the Yugoslav leader turned to the W. for economic help, and his assertion of Yugoslavia's rights in the face of Russian threats rallied elements of the pop. previously antagonistic to the régime, to him. Now that the Gk Communists could no longer rely on active Yugoslav help from across the Gk-

Yugoslav frontiers, their chances of winning the civil war declined considerably, and they were finally crushed by Papagos (q.v.).

Formation of the Federal German Republic and the German Democratic Republic—European Coal and Steel Community.—A constitution for a W. Ger. federal rep. embracing the ter. administered by Britain, France, and the U.S.A. was adopted at Bonn in May 1949. Following elections there, the W. powers ended their military occupation, though retaining troops in W. Germany for defensive purposes. Heuss (q.v.), a liberal,

first president of the new rep. with its cap. at Bonn, and Adenauer (q.v.), a Christian Democrat, its chancellor. Russia protested against the creation of the new state and in Oct. a 'German Democratic Republic' was proclaimed in the Russian zone of Germany, with a gov. obviously modelled on that of the other Russian satellites. This division of Germany into 2 states, 1 on each side of the 'iron curtain,' seemed to make eventual German reunity more distant than ever, though it remained the avowed aim of both govts. and was now acknowledged by all the major powers. The W., however, countered all Russian suggestions for Ger. reunification by insisting that reunification must be preceded by genuinely free elections in both E. and W. Germany; and this condition Russia was never prepared to accept.

The Statute of the Council of Europe was signed by 10 nations in London in 1949; and the following year, W. Germany was invited to join the Council. In May 1950, Robert Schuman, the Fr. foreign minister, proposed a plan for pooling European coal and steel production under a single authority, having supra-national powers (see EUROPEAN COAL AND STEEL COMMUNITY). Britain expressed interest, and said she would co-operate with any authority that was estab. on these lines, but declined to join, but eventually 6 countries, Belgium, Luxembourg, the Netherlands, France, W. Germany, and Italy agreed to a conference. A treaty was signed, April 1951, which was ratified in June 1952. This was a considerable step towards ultimate European economic unity.

Problems of West German Rearmament—Korean War—Belgium.—Throughout 1950 the W. was increasingly absorbed by the problem of W. Ger. rearmament. There was already a militarized Ger. force in the E., allegedly confined to police duties, about which France, Britain, and the U.S.A. had unsuccessfully protested. In the W. it was felt essential that W. Germany should play her part in the military defence of W. Europe; but action was held up largely by the Fr. fears of a rebirth of the old Ger. militarism. In New York in Sept. the Brit., Fr., and Americans formally agreed that Germany should contribute to a European defence force; but no agreement was reached on detail. In Dec. Eisenhower (q.v.) was appointed supreme commander of the proposed W. European defence force.

The year's events in E. were overshadowed by the outbreak of the Korean War (q.v.) which soon had economic repercussions in E. Most of the W. European countries eventually contributed either combatant or non-combatant units to the U.N.O. force in Korea. The most spectacular political events of the year occurred in Belgium (q.v.) where the return of King Leopold caused rioting which threatened to lead to civil war: the crisis was solved, when Leopold delegated his powers to his son, Baudouin (q.v.) (Aug. 1950). Baudouin became king on Leopold's abdication in July 1951.

In 1951 the organisation of the N.A.T.O. forces began to take concrete shape. Turkey and Greece were admitted to N.A.T.O. in the autumn. But the question of a Ger. military contribution to N.A.T.O. was still unsettled. In Jan. the Mr. premier, Plevin, suggested a unification of the military forces of W. Europe under a European Minister of Defence subordinate to a European Council of Ministers—a military counterpart to Schuman's coal and steel plan. Negotiations proceeded throughout the year with Plevin's scheme as their basis. It was clear that France wanted political safeguards before she would permit Ger. re-armament: but her views appeared to imply an amount of European unification involving Britain which Britain was not prepared to accept.

During the year the W. Powers and Russia both put forward disarmament proposals, but these came to nothing. Meanwhile, re-armament in W. Europe coupled with the effects of the Korean war, was causing economic difficulties in some countries. W. Germany, however, with no re-armament burden, was entering on a period of booming economic prosperity. In Britain, the Conservatives under Churchill were returned to power after 6 years of Labour gov.

The European Defence Community (E.D.C.).—Death of Stalin—Revolution in East Berlin—End of Korean War.—It was becoming increasingly clear that Russia was particularly anxious to prevent W. Germany re-arming. During 1952 she made further proposals for a Ger. peace-treaty, but these foundered, as before, on the issue of free all-Ger. elections. The W. powers' suggestion for an Austrian peace-treaty (Mar. 1952) were rejected by Russia. In the same month Ismay (q.v.) became secretary-general of N.A.T.O., with H.Q. in Paris: in Sept., 8 N.A.T.O. countries took part in joint military and naval manoeuvres. On 26 May the Ger. Contract, ending the occupation of W. Germany and granting sovereignty to the Federal Rep. was signed in Bonn by representatives of France, Britain, and the U.S.A. and Chancellor Adenauer, in spite of some last-minute Fr. misgivings. The day before Russia had again suggested talks on a Ger. peace-treaty. Then, on 27 May the treaty to estab. the European Defence Community (E.D.C.) by which France, Luxembourg, Italy, Belgium, the Nether-

lands, and W. Germany agreed to joint defence forces, was signed in Paris. The Brit. and Amer. govts. linked themselves to E.D.C. but did not join it: and the treaty establishing it had to be ratified by the parliaments of the nations concerned before it came into force. It was already clear that Fr. public opinion was far from united on the issue. At the end of May Ridgway succeeded Eisenhower as supreme commander of the S.H.A.P.E. forces in Europe (subsequently succeeded by Gruenther, and then by Norstad). At the end of June Marshall Aid came to an end. But the problem of the 'dollar gap' remained.

During 1953 the common coal and steel markets of the European Coal and Steel Community came into being. There were also tentative moves to forward the idea of European political unification but the draft treaty for a European Political Community, put forward in May, received a hostile reception from every major country involved. More sound, if less ambitious, signs of unity among the European powers were the first annual session of the Nordic Council (Denmark, Norway, Sweden, and Iceland) which met in Feb., which had common citizenship as its ultimate aim, and the treaty of friendship signed in 1953 between Yugoslavia, Greece, and Turkey.

In Mar. 1953 Stalin d. suddenly. There was an apparent lessening of tension between W. Europe and the Soviet bloc and in May Churchill proposed top-level private talks between the 4 great Powers, with a view to solving their outstanding differences. Russia, however, was anxious to include Communist China in any such conference and made a number of other conditions which precluded any possibility of Western agreement. She again raised the question of a Ger. peace-treaty in 1953, with the apparent intention of influencing the elections in W. Germany against Adenauer, the supporter of E.D.C.: but in spite of this Adenauer and his gov. were returned to power (Oct.). It was obvious that the Soviet satellites were being subjected to increasing economic strain. In May the Czech currency was revalued, and there were riots; but on 17 June serious rioting broke out in the Soviet sector of Berlin which at one point seemed to be about to touch off a revolt all over E. Germany (there were, in fact, simultaneous riots in other E. Ger. cities) and which was only crushed by Soviet tanks. Afterwards, a number of economic concessions were announced, and the E. Ger. gov. was reorganised. The flow of refugees from E. Germany to the W. increased considerably.

The year had opened with severe storms and gales which caused terrible damage in the Netherlands and along the E. coast of Britain, and heavy casualties. Through the year, the process of ratifying E.D.C. in the various parliaments concerned continued slowly. In Sept. the U.S.A. signed a 10-year defence agreement with Franco Spain, under which the U.S.A. was granted naval and military bases in Spain, and

Spain received Amer. economic aid. The Korean War ended in Sept., when a truce was signed at Panmunjong. In Italy, the Christian Democrats again formed a gov. after the general election in June, although the Montesi scandal at one time threatened to bring down the gov. and actually caused the resignation of Piccioni, the able and pro-W. foreign minister.

Four-Power Conference in Berlin
Geneva Conference on Indo-China—Rejection of E.D.C. by France—London Agreements—Settlement of Trieste Problem.—1954 opened with the long delayed Four-Power Conference, which met in Berlin in Jan., but it was soon obvious that Russia's attitude towards the major outstanding issues—Austria and Germany—was fundamentally unchanged in spite of her changed leadership. Molotov agreed to discuss an Austrian peace-treaty but no agreement was reached on the subject. The Russian foreign minister bitterly attacked E.D.C., threatening that W. Ger. adherence to it would end all hope of a peace-treaty with Germany. He again raised the question of China being included in high-level discussions. The conference ended in failure in Feb. but it was agreed that a conference at Geneva in April-July would meet to discuss Korea and Indo-China. At this conference Chinese representatives did attend, and the Indo-China conflict was settled; but no agreement was reached on Korea.

The future of E.D.C. was still in the balance. It was obvious that France was having growing doubts on the subject. Russia was playing a temporarily conciliatory hand, which had its effect on Fr. public opinion and in March and again in July she suggested a general European treaty of collective security, and proposed that she herself might join N.A.T.O. In Aug. the E.D.C. countries met at Brussels to try to resolve the Fr. doubts on the treaty, but the conference broke up without agreement being reached, and on 30 Aug. the Fr. Assembly rejected E.D.C.

The Brit. Gov. took the initiative in starting discussions with France, W. Germany, and the other E.D.C. powers to find a formula acceptable to France which would take the place of E.D.C. A 9-power conference opened in London in Sept. and agreement was reached in Oct. The Ger. Federal Rep. was to enter N.A.T.O., and both Germany and Italy should enter the Brussels Treaty Organisation. Britain guaranteed to retain substantial armed forces on the continent to help in Europe's defence, and the U.S.A. agreed to give the new formula the same moral and material support that she had pledged to E.D.C. Russia countered this substantial success in the cause of Western Union by suggesting new talks on Germany, but Britain, France, and the U.S.A. insisted that these could not take place until the London and Paris agreements had been ratified by all the nations concerned.

W. Europe's strength was further increased during 1954 when in Oct. Italy and Yugoslavia initialled an agreement in

London settling the Trieste dispute, which had caused antagonism between the two countries ever since the end of the war. Zone A, including Trieste city, went to Italy, Zone B to Yugoslavia, and the port of Trieste remained a free port.

An Austrian Peace-Treaty—West Germany joins N.A.T.O.—Easing of East-West tension.—Further political changes took place in Russia in 1955. Malenkov (q.v.) was replaced by Bulganin and Krushchev (q.v.). In May a Four Power conference in Vienna finally agreed on an Austrian Peace Treaty, which was signed on 15 May and came into force on 27 July.

By the beginning of May the ratification of the London agreements was completed. Germany became a member of N.A.T.O. on 19 May though it was November before the new Ger. army came officially into existence, and not until 1957 were the first Ger. conscripts called up. The Ger. opposition (Social Democrats) continued to attack Ger. re-armament within N.A.T.O., primarily on the grounds that it made an eventual re-unification of Germany less likely, a fear which, as the Russians had long known, had a profound effect on sections of Ger. public opinion that were far from Socialist. The questions of Germany's financial contributions to W. defence, and towards the maintenance of foreign troops stationed in Germany for German's own defence and for that of W. Europe as a whole also remained unsettled.

E.-W. tension seemed to ease during the second half of the year. The heads of the Fr., Brit., Russian, and the U.S. govts. met at Geneva in July—the first such meeting since Potsdam, 10 years before—and though nothing very tangible resulted from their discussions, the atmosphere was noticeably cordial. In Oct.-Nov. however, a meeting of the 4 foreign ministers of these states, which had been proposed by the July meeting, ended in complete disagreement on every topic discussed. In June, there were signs of a Yugoslav-Russian rapprochement, although Tito declared his intention of preserving his existing links with the W. The Hungarian communist gov. released Cardinal Mindszenty from prison on health grounds in July, though he remained under house arrest. In Sept. the W. Ger. chancellor, Adenauer, went to Moscow for talks, as a result of which diplomatic relations were estab. between the Federal Rep. and Russia, and Russia agreed to return the remaining Ger. prisoners of war that she still detained to Germany.

Increased Tension in the Mediterranean and the Middle East—The Saar.—There were indications, however, that the centre of tension were shifting towards the Mediterranean and the Middle E. The *crusis* campaign in Cyprus (q.v.) had now become extremely bitter. A conference in London attended by Gk and Turkish gov. representatives ended in failure. The Cyprus situation embittered Anglo-Gk relations, and caused dissension between Greece and Turkey, so that by 1956 the N.A.T.O. link in the E. Mediterranean, as

represented by Greece and Turkey, had become virtually ineffective. In the Middle E. the W. still retained considerable political and economic influence through the Bagdad Pact (q.v.) of which Britain was a member: but the U.S.A.'s refusal actually to join the pact weakened its effectiveness. Egypt was rapidly building up an anti-W. bloc in the Middle E., and there were signs of growing Soviet influence in the area. Fr. public opinion was becoming more concentrated on the growing problem of Algeria: but the result of the Saar plebiscite in Dec., which rejected the proposed European Statute, caused a shortlived revival of Fr. fears about Germany. France and Germany subsequently reached agreement on the Saar (1956), however, and on 1 Jan. 1957 the Saar became part of the Federal Rep.

Change of Government in Poland—Revolution in Hungary.—In Feb. 1956 Khrushchev made an outspoken denunciation of Stalin and Stalinism which indicated that in future more freedom of action was to be allowed to the Soviet satellites: and indicated, too, that serious economic problems existed in E. Europe which were now being blamed on to the errors of the Stalin regime. In April the dissolution of the Cominform was announced. In June there was serious rioting in Poznan, Poland. By Oct. the situation in Poland was so critical from the Russian angle that Bulganin and Khrushchev visited the country on the 19th to attempt to retrieve matters. The 'Titoist' Communist Gomulka was elected secretary of the Polish communist party and thus became the effective ruler of Poland: Rokossovsky was dropped from the Politburo and subsequently returned to Russia. By Jan. 1957 it seemed that Poland had achieved a compromise gov. on Titoist lines, entailing considerably more internal freedom and independence of action, though Russian troops remained in the country. The Polish example touched off a similar train of events in Hungary (Oct.) but these rapidly became not merely anti-Russian but anti-Communist in form, and the Russians eventually used force (Nov.-Dec. 1956) to crush what had become a revolution aimed at the estab. of a gov. on W. democratic lines. A Soviet puppet regime under Kardar was estab. in Budapest and a campaign of savage repression followed. Resolutions passed by the U.N. condemning Russian action were entirely ignored by the Soviet Union. W. Europe and the U.S.A. opened their frontiers to the flood of refugees which poured out of Hungary.

Suez Crisis—Middle East becomes the centre of crisis.—While N.A.T.O.'s military strength as a whole increased throughout the year, the continuing tension between Greece and Britain and Greece and Turkey weakened it politically, and Iceland's useful position within the organisation was for a time in doubt. The question of Ger. re-unification still loomed large in the internal politics of W. Germany, but for the time being the Great Powers were concentrated on other issues.

But during the second half of 1956 W. Europe was affected principally by Middle E. events and W. Europe itself ceased to be the main scene of action. In July Nasser nationalised the Suez Canal: on 29 Oct. Israeli troops invaded Egypt, and France and Britain landed troops in Egypt with the declared intention of separating the combatants and safeguarding the Suez Canal. The immediate effect however, was to unite world opinion against Britain and France (whose action was condemned in the U.N.) and to destroy at least temporarily, what Anglo-Fr. influence remained in the Middle E. The Suez Canal had been blocked by Egypt in the first few hours of the fighting, and this had serious economic repercussions in E. In France and Britain petrol and oil were rationed: in most of the rest of W. Europe petrol restrictions of some kind were necessary. By Jan. 1957 the Anglo-Fr. forces had withdrawn from Egypt, being replaced by a U.N.O. force, and salvage work had begun on the Canal. But events since July 1956 had shown all too clearly that W. Europe's vulnerability lay now not along the frontier between E. and W. Germany, but in the Middle E.: and here there was no N.A.T.O. to safeguard her. *See also EUROPEAN COMMON MARKET.*

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N.B.—This bibliography is intended to be only general in character. For detailed bibliographies see individuals, and individual events, countries, wars, pacts, etc. referred to in the article.

European Coal and Steel Community. In May 1950 Schuman, Fr. foreign minister,

proposed a plan for pooling E. C. and S. production under a single 'high authority,' possessing supra-national powers. The outcome of this 'Schuman plan' was the treaty of 18 April 1951, signed in Paris by France, Belgium, the Netherlands, Italy, Federal Germany, and Luxembourg, setting up the E. C. and S. C., which had been ratified by all the countries concerned by June 1952. A common market for coal and iron ore was estab. Feb. 1953, and for steel in May. The High Authority of the organisation (first president, Monnet of France: H.Q., Luxembourg) was then empowered to abolish customs duties and other restrictions on the inter-state trade of these commodities. Britain would not join the Community, but in Dec. 1954 signed an 'Agreement of Association' with it, and sev. other states (including the U.S.A. and the Scandinavian bloc) maintain delegations with the High Authority. The Community has done much to further European economic union and has provided inspiration for suggested similar 'pools' for atomic energy ('Euratom'), etc. The High Authority has pub. an ann. general report since 1953.

European Common Market, estab. by 6 countries, Belgium, France, Germany, Italy, Luxembourg, and the Netherlands, in the Rome Treaty of Mar. 1957, to create a 'Common Market' within a common external tariff wall. The process was to take the form of gradual reductions in tariffs and other restrictions on trade between the 6 countries, spread over 12 to 15 years. Within the E. C. M. there was to be free movement of labour and capital, and common policies for agriculture and transport; and for an experimental period of at least 5 years the overseas territories of the six were to be associated with the parent community. An elaborate institutional structure, including a council of ministers to decide major policy questions by a system of weighted voting, was created. A social fund was to assist workers displaced by the free competition within the E. C. M., and an investment fund was to help underdeveloped regions in the market area. The general purpose was continental economic integration, in which there would be deliberate co-ordination of economic policies, leading ultimately to increasing political integration. The motives for the creation of the E. C. M. were both the urge to raise living standards by greater international div. of labour (as was shown to be possible by the Coal and Steel Community) and the urge to unite in the face of Russian influence in Europe.

In view of this closer economic and (in time) political integration of some of the main countries on the Continent, Great Britain proposed the formation of a Free Trade Area in association with the E. C. M. The idea was for the 16 members (all or some) of the Organisation for European Economic Co-operation (O.E.E.C., q.v.) to form an even larger Area, of which the E. C. M. would be part, in which there would be free trade in industrial products but not, or not necessarily, free movement of labour or capital, or common policies in

agriculture or transport, and in which each country would continue to fix its national tariffs, subject to the rules of the General Agreement on Tariffs and Trade (G.A.T.T., q.v.). The area would be estab. on a consultative basis through the O.E.E.C., and would be a much looser grouping than the more closely-knit E. C. M. The Brit. proposal that agriculture be excluded from the Free Trade Area rested on the view that otherwise the system of imperial preference, under which agric. imports from the commonwealth are favoured compared with those from other countries, would be undermined. An opposite view was that many preferences were not of great value to the Commonwealth, that some sacrifice had to be made for the advantage to Brit. manufactured goods of access to a European market comparable in size with that of the U.S.A. or U.S.S.R., and that the Commonwealth countries might on balance gain from the larger European market for their agric. exports. The arguments for Brit. association with the E. C. M. through the Free Trade Area varied widely from the positive one that Britain should lead Europe in its endeavours to associate more closely (although Britain herself would not integrate politically) to the negative one that if Britain stayed out Germany would dominate Europe.

At bottom the difference between the E. C. M. and the Free Trade Area is that while the 6 have been ready to abandon some national sovereignty and to create a supra-national authority in order to reap the advantages of international co-operation, the Brit. approach has been influenced by the reluctance to loosen the ties with the Commonwealth (and with the U.S.A.) and to commit herself too deeply in Europe by political association. See also CUSTOMS UNION.

European Corn Borer (*Pyrausta nubilalis*), moth, comparatively harmless to crops in Europe, where it has long been known, but regarded as a serious menace in the U.S.A. It made its first appearance on the E. coast of America in 1917, having been carried in, presumably, on Eng. vessels, and since then has penetrated further W. It has chiefly attacked Indian corn, where its ravages have threatened the future of the whole crop. The alarm of agriculturists during 1926 led to the sum of 10,000,000 dollars being granted by Congress to fight the invader, and 2 lines of defence have since been adopted with some promise of success. One of these is the importation of parasites that prey upon the moth, and the other consists in thoroughly cleaning up the fields after an Indian corn harvest, and destroying all stalks and vegetable refuse with fire, in order to prevent further breeding of the moths.

European Defence Community (E.D.C.), proposed defensive federation of France, Belgium, Italy, Luxembourg, the Netherlands, and the Ger. Federal Rep. The treaty establishing E.D.C. was signed in May 1952, but required ratification by the

parliaments of the countries concerned before it came into force. From the first France had reservations about it, partly because she considered the control of armaments envisaged under it inadequate, and partly because Britain and the U.S.A., though linked with the treaty, were not members of E.D.C. In spite of protracted negotiations to come to an agreement satisfactory to France, the Fr. assembly rejected E.D.C. 30 Aug. 1954. E.D.C. was subsequently superseded by the defence arrangements made under the London and Paris agreements (q.v.). See also WESTERN UNION; EUROPE, HISTORY.

European Payments Union (E.P.U.), a project of the Organisation for European Economic Co-operation (q.v.), is a self-working multilateral system for offsetting the monthly surpluses or deficits of the member-countries, for determining a single balance, for granting gold and dollar credits, and for softening the impact of short-term fluctuations. E.P.U. will have fulfilled its purpose when full currency convertibility supplants it, first with and afterwards without a supporting European Fund. The most encouraging result of E.P.U. and O.E.E.C. has been the gradual elimination of quantitative restrictions. By mid-1950's three-fourths of W. E. trade on private account had been freed from quotas. (A result was that the tariff question once again became more important than the quota question.) In 1954 the average level of 'liberalisation' was 83 per cent. The figure improved to 90 per cent during 1955. In 1948 and 1951 production deficiencies and raw material shortages dominated the European scheme. In more recent years the main problem has become that of the balance of payments.

Europium, chemical element discovered by Demarcay in 1896. It belongs to the group of rare earths. Its symbol is Eu, its atomic weight 152, and its atomic number 63. E. oxide is a pale powder.

Eurotas, one of the chief rivs. of the Peloponnese, in Greece. Its course is not more than 50 m., flowing through Laconia to the gulf of Gythion.

Euryale Ferox, genus of one species, family *Nymphaeaceae*, is an ann. aquatic herb, bearing deep violet flowers and edible seeds, native to the E. Indies.

Eurydice: (1) Wife of Orpheus. She was bitten by a serpent while fleeing from Aristaeus (q.v.). Orpheus descended to Hades after her, and with his music persuaded Pluto to let her follow him back to the upper world, on condition that he should not once look behind him. This, however, he did, and E. was snatched from him again. See Virgil, *Georgics*, iv; Ovid, *Metam.*, x 1.

(2) Illyrian princess, wife of Amyntas II of Macedonia, mother of Philip II and Perdiccas III.

(3) Wife of Arrhidacus, the imbecile son of Philip II. They were married in 322 bc and put to death by order of Olympias (317 bc).

Eurymedon, in anc. geography, riv. of Pamphylia, Asia Minor. At its mouth the

Athenian commander Cimon signally defeated the Persians in 467 bc. Its modern name is Koprü.

Eurynome, genus of decapod brachyurous crustaceans, which belongs to the family Mafidae; the species are known as spider-crabs. *E. aspera* inhabits the Mediterranean.

Eurypterids, an extinct subclass of aquatic merostome arthropods which lived from Ordovician to Permian times, but were most abundant during the Silurian and Devonian. Some giant forms of the genus *Pterygotus* are the largest known arthropods.

Eurystheus, see HERCULES.

Eusden, Laurence (1688-1730), Poet Laureate, b. Spofforth, Yorks, son of the rector. He was educ. at St Peter's School, York, and Cambridge. In 1717 he wrote a poem to celebrate the marriage of the duke of Newcastle, who in gratitude used his powers as lord chamberlain to appoint E. Poet Laureate when the post fell vacant in the following year. This unworthy choice was naturally resented by other poets, and Pope pilloried E. in his *Dunciad* as a drunken parson. He had in fact taken orders about 1725, and became rector of Coningsby in Lincs. His trans. from Claudian and Statius are better than his original work; he also made some contributions to the *Spectator* (q.v.).

Eusebius of Emesa (AD c. 295-c. 360), b. at Edessa; he refused the see of Alexandria, being averse from theological disputes, but accepted the small bishopric of Emesa, instead. He was, however, driven from this, accused of sorcery for his prowess as a mathematician and philosopher. Only fragments of his works survive.

Eusebius of Nicomedia (d. c. 342), Gk bishop and theologian, related on the maternal side to the Emperor Julian, whose early tutor he was. Like E. of Caesarea, he was a defender of Arius (q.v.), and placed himself at the head of the Arian party after the Council of Nicea. The Emperor Constantine was baptised by him in 337, and 2 years later he was promoted to the see of Constantinople.

Eusebius Pamphilus of Caesarea (AD c. 264-c. 349), 'father of eccles. hist.', probably b. in Palestine, took the name of his martyred instructor, St Pamphilus. About 313 he became Bishop of Caesarea and was prominent in the Council of Nicea, as leader of the semi-Arian party, which, opposed to discussing the nature of the Trinity, preferred the old language of Scripture in referring to it. He is reputed the most learned father of the Church, after Origen and Jerome; Constantine said that he was fit to be the bishop of all the world. Two of his treatises survive, the *Preparation* (*Praeparatio Evangelica*) and the *Demonstration* (*Demonstratio Evangelica*) of the Gospel, 2 apologetic works, and many other writings of the highest value, especially *The History of the Church, from the Time of its Founder to the Year 323*, and the *Chronicon*, a hist. of the world to 328, containing extracts from many works no longer

extant. Some of the most informative passages in his *History* are those on the liturgy and primitive ritual, on the Ignatian Epistles, on the persecutions of Diocletian and Trajan, and on the Thundering Legion. Less important are *The Martyrs of Palestine*, treatises against Hierocles and Marcellus, the *Theophania* (discovered 1839), and a panegyric *Life of Constantine*. See E.'s complete works, ed. E. Schwartz and T. Mommsen (1903-09); *Church History*, ed. Heinichen, 3 vols. (1868-70), with the *Life of Constantine* and the *Oration in Praise of Constantine*; also the article on E. in J. Herzog's *Encyclopædia*, 1854; I. Dörner's *History of the Person of Christ*, (ii) 1839; P. Schaaf's *Church History* (ii) 1867; Introduction to Lee's trans. of the *Theophania*; J. J. Blunt's *The Christian Church during the first three centuries*, 1888. See also trans. by Kirsopp Lake and J. E. Oulton, 1926-32, and by H. Lawlor and J. E. Oulton, 1927-8.

Euskara, see **BASQUE**.

Euskirchen, Ger. tn in the Land of N. Rhine-Westphalia (q.v.), 33 m. S. of Düsseldorf (q.v.). It has important textile industries. During the Second World War E. was of strategic importance as a road-centre during the allied advance to the Rhine in Feb., 1945. Its capture, with that of Prüm (in the Eifel, q.v.), led to the breaching of the Siegfried Line (q.v.) in this region, and eventually to the seizure of the bridge at Remagen (q.v.). Pop. 20,000.

Euspongia, see **SPONGES**.

Eustachian Tube (after Bartolommeo Eustachio, It. anatomist, 1520-74), cylindrical tube lined with mucous membrane, dilated at both ends and connecting the cavity of the middle ear with the pharynx, to which it passes downwards, forwards, and inwards, for a distance of about 1½ in. It is partly osseous, but chiefly cartilaginous. Sound vibrations acting on the *tympanic membrane* and the *fenestra ovalis* cause constant changes of pressure in the middle ear, which changes are equalised by means of this tube. It is open during rest, but closed during deglutition. Permanent occlusion of this tube is one of the most common forms of deafness. See **EAR**.

Eustachian Valve, after Eustachio, the attachment which in the foetus directs the blood from the inferior vena cava through the foramen ovale into the left auricle. Its remains will be found attached to the right and lower margins of the opening of the inferior vena cava.

Eustachio, Bartolommeo (1520-74), It. physician and anatomist, b. Severino. His name is perpetuated in the Eustachian tube (q.v.) although he was not first to discover it. He was physician to the pope and taught anatomy in Rome. His *Tabulae Anatomicae*, unpub. until 1714, would have estab. him as one of the greatest of all anatomists had they been pub. during his lifetime. He made many discoveries in anatomy. Besides the *Tabulae*, he wrote *Opuscula Anatomica*, 1564.

Eustathius (d. c. 1193), celebrated Gk

scholar, b. Constantinople. He first became a monk and afterwards a deacon and teacher of rhetoric in his native city. In 1160 he became archbishop of Thessalonica and subsequently of Myra. E. was a man of great learning, and was deeply versed in the anc. classic authors. His commentary on Homer (1st ed. Rome, 1542-50) is his prin. work. Some letters and theological and historical treatises were first pub. by Tafel in 1832, and *De capita Thessalonica* (an account of the taking of Thessalonica by the Normans in 1185) by I. Bekker in 1842.

Eutaw Springs, near Eutawville, in S. Carolina, U.S.A. The E.S. originate at the foot of a hill, and spread into a large stream which disappears underground to appear again farther on. The last battle of the War of Independence in S. Carolina was fought here, 8 Sept. 1781.

Eutectic, name which was given by Frederick Guthrie, a scientific writer, to those mixtures in which the components are in such proportions as to solidify on cooling, after melting, at one temp. like a pure substance. This temp., which is called the E. point, is the lowest freezing temp. of any mixture of the components. E. mixtures play an important part in the constitution of alloys, the heterogeneous structure of which may be demonstrated by the uneven action of etching agents.

Euterpe: 1. The goddess of lyrical poetry represented with the double flute. See **MUSES**.

2. Genus of tropical Amer. spineless palms, 10 species; *E. edulis*, the Assai palm, produces an edible fruit from which a nutritious drink 'Assai' is made; *E. oleracea*, the cabbage palm, yields an edible terminal bud, and some timber.

Euthanasia, the administration of pain-relieving drugs to those who are dying. The term is also applied to the direct painless killing of human beings who are suffering from mental or physical disease that is thought to be incurable. In this latter sense E. is illegal, but has been the subject of much controversy; it is absolutely condemned by the Rom. Catholic Church, no matter what the circumstances, as a violation of the divine law. The Voluntary E. Society, founded in 1935 and backed by a number of non-Rom. Catholic doctors and clergymen, unsuccessfully promoted a bill to legalise E. The question was again debated by the House of Lords in 1950 (see **HANSARD** (House of Lords), 28 Nov. 1950), when physicians and surgeons of the highest eminence and experience made clear their unqualified disapproval of the practice. See the address of Pope Pius XII to members of a National Congress of It. anaesthetists, delivered on 24 Feb. 1957. See also C. K. Millard, *Euthanasia, a Plea for Legislation*, 1931; H. Roberts, *Euthanasia*, 1936.

Eutheria (Gk *eu*, well, and *therion*, an animal), name given to a sub-order of mammals (q.v.) comprising all but the marsupials and monotremes, first applied by Gill in 1872. It is a synonym of **Monodelphia** and **Placentalia**.

Eutocius (c. AD 550), Gk mathematician and geometer of Ascalon, in Palestine, and pupil of the architect Isidorus. He is noted for his *Commentaries on Apollonius of Perga and Archimedes*, 4 of which are extant, including comments on Archimedes' *Treatise on the Sphere and Cylinder*. E. discusses the problem of the duplication of the cube and gives sev. solutions.

Eutropius, Flavius (d. c. AD 370), Rom. historian. He was secretary to the emperors Constantine and Julian, accompanying the latter on his Parthian expedition. He probably rose to high office in the state, possibly that of senator or consul. He wrote *Breviarium Itorum Romanorum ab urbe condita*, a concise hist. down to the death of Jovian, AD 364. The work was continued by Paul the Deacon and Landulfus Sagax, who brought it down to AD 820. See the ed. by F. Rühl (2nd ed. 1913), and that (with the continuations) by H. Droysen in *Monumenta Germaniae Hist.*, II (1879).

Eutyches, originator of the Eutychian heresy, which held that after the Incarnation Christ had but *one* nature, the human nature being absorbed in the divine. The cause of E., however, was somewhat favoured at Alexandria, where St Cyril had taught an apparently similar doctrine; and owing to the influence of Dioscurus of Alexandria, a fresh council was held at Ephesus. To this period belongs Pope Leo's famous treatise on the two natures of Christ in the Incarnation. E. was restored by the 'Robber Council' of Ephesus (449), but this decree was reversed at Chalcedon (451). After this, the heretic disappears from hist., and the sect became subject to penal laws.

Euwe, Max (Maasgijels) (1901-), Dutch chessmaster, b. Watergraafsmeer near Amsterdam, Netherlands. At an early age he was recognised as the best chess player in Holland, and he won the world championship by beating Alexander Alekhine (q.v.) in a match in 1935. However, he held the title for only 2 years, since he was defeated in a return match by Alekhine in 1937. By profession a teacher of mathematics, he was also a most prolific writer of books on chess and his writings have had considerable influence on modern chess theory. In style of play and in his writing he is a great apostle of methodical logic. See his *Judgement and Planning in Chess*, 1953.

Euxine, see BLACK SEA.

Evagoras, ruler of Salamis in Cyprus, c. 410-374 BC. The Athenians and Egyptians aided him in his long wars with the Persians, ending with a peace in 376 (see Xen., *Hell.* II. 1). He was assassinated, and succeeded by his son, Nicocles. An oration of Isocrates praising E. is still extant. E. II succeeded Nicocles, and was dethroned by Protagoras.

Evagrius (c. 536-94), 'Scholasticus,' of Antioch, wrote a *Church History* (from AD 431-594), a continuation of the work of Eusebius, ed. J. Bidez and L. Parmentier, 1898. He also trans. Athanasius' *Life of St Anthony* into Lat.

Evaid, Johannes, see EWALD, JOHANNES.

Evander, son of Hermes, 60 years before the Trojan War led an Arcadian colony to Latium, founding Pallantium (later the Palatine Hill). He was supposed to have taught the inhab. various arts and sev. Arcadian cults, particularly that of Pan (Faunus). He was venerated as a hero on the Aventine. He is father of Pallas, and ally of Aeneas against Turnus in *Aeneid.* viii, x, xi. See H. Nettleship, *Lectures and Essays*, 1895.

Evangelical (adj. from Gk *euangelos*, good tidings, Gospel). This term was originally claimed as a right by all Protestants, in that their beliefs were derived entirely from the evangel or Bible. In the course of time, however, its use and meaning have varied greatly. The term has been especially applied to the school which insists on the utter depravity of unregenerate human nature, necessity for conversion, justification of sinners by faith, free offer of the Gospel to all mankind, and the divine inspiration, authority and sufficiency of Holy Scripture (reserving the right of individual believers to interpret scriptural passages according to their judgment). In the Anglican communion, holders of such beliefs are usually known as 'Low Church.' In Germany the word applies to the United Church as opposed to the Lutheran and Reformed Churches, but it is also sometimes assumed by the pietistic party within the Protestant Church. See CHURCH HISTORY.

Evangelical Alliance, voluntary association of Protestant Christians of various countries and denominations, first formed in London, 1846, at a conference of 921 clergymen and laymen, representing some 50 Protestant churches. The idea started in Scotland, as a protest against Popery and Puseyism (see PUSEY). Nine points were agreed upon as a basis of the A. formed by members holding 'the views commonly called evangelical.' Its aims include maintaining religious liberty throughout the world and succouring the persecuted. It held many international meetings and pub. a monthly journal, *Evangelical Christendom*. See A. Bonnet, *Lettres sur l'alliance évangélique*, 1847; A. J. Arnold, *History of the Evangelical Alliance*, 1897.

Evangelical and Reformed Church, a Protestant body based largely in Pennsylvania, Missouri, and Illinois, of Lutheran and R., Ger., Swiss, and Fr. origins. It was formed between 1934 and 1941 by the union of the E. Synod of N. America and the R. Church in the U.S.A. In 1954 it had 1900 pastors, 774,000 communicants, a Sunday-school enrolment of 515,000, and property of the value of \$266,500,000. In 1956 union with the Congregational Christian churches (see CONGREGATIONALISM) was authorised, to take effect in 1957 under the name United C. of Christ. The R. C. in America is a separate body.

Evangelical Church. This religious body of N. America was founded in E. Pennsylvania by Jacob Albright (Albrecht) in 1800. The rules of gov. and beliefs adopted were very similar to those of the

Methodists. Albright was leader of the association till his death in 1808. In 1816 the first ann. conference was called and in 1818 the present title was first adopted. In 1846, when it merged with the United Brethren in Christ to form the Evangelical United Brethren Church, it had 213,000 members in the U.S.A.

Evangelical Union, religious body (also called Morisonians) formed in Scotland, 1843, by the Rev. J. Morison of Kilmarnock and other ministers who had left the United Secession Church. They were joined by ministers from the Congregational U. who held similar views. The chief article of their faith was belief in the universality of the Saviour's atonement. They also believed in the freedom of the human will. By 1896 the Congregational Union absorbed nearly all the churches. See the *Doctrinal Declaration* of the union, 1856; F. Ferguson, *The History of the Evangelical Union*, 1876, and *The Worthies of the Evangelical Union*, 1883.

Evangelical United Brethren Church, formed by the union in 1846 of the Evangelical Church and the United Brethren in Christ (q.v.). The total membership in 1952 was 724,000.

Evangelist (a bringer of good tidings, preacher of the Gospel), in the N.T., signifies an official of the Christian Church, whose chief duties seem to have been those of a missionary and pioneer. The E. is not permanently connected with any local field of work, or employed in the regular ministry; his work is of an itinerant rather than a local nature. Thus Philip of Caesarea and Timothy of Ephesus are called E.s. The term was also used in post-apostolic times for those who read and explained the written Gospels in public worship; but it is more often used to-day in its earlier sense and has been transferred to the writers of the 4 Gospels.

Evans, Sir Arthur John (1851-1941), archaeologist, b. Nash Mills, Hertfordshire, eldest son of Sir John E., a wealthy paper-maker and distinguished antiquary. Educ. at Harrow, Oxford, and Göttingen. Married a daughter of E. A. Freeman, the historian. He made archaeological explorations in Finland, Lapland, Balkans, and Crete. In 1884 he was appointed keeper of the Ashmolean Museum, which he entirely reorganised, leaving it in 1896 without a rival in England outside national collections. His Cretan enterprise, whereby he discovered the pre-Phoenician script, made him famous and won him academic honours all over Europe. By his discoveries through excavations at Knossos, where he built himself a villa, he carried further the work of Schliemann, proving, in his *Cretan Pictographs*, 1896, and *Further Discoveries of Cretan Script*, 1898, that the Mycenaean or Aegean culture did in fact possess a system of writing. His chronological scheme of Aegean archaeology, as set out in his *Essay on the Classification of Minoan Civilization*, 1906, has been accepted almost universally. He issued the first part of his *Scripta Minoa* in 1909. But his greatest work is his *The Palace of*

Minos, which did not begin to appear till 1921 (completed 1936). It deals with the earlier Minoan periods and is the definitive pub. of his Cretan discoveries. Other works include *Mycenaean Tree- and Pillar-Cult*, 1901, *Through Bosnia*, 1875. E. also ed. and supplemented Freeman's *History of Sicily*, vol. iv, 1891. In 1914 he was elected to the Chair of the Soc. of Antiquaries. Extraordinary Prof. of Prehistoric Archaeology, Oxford Univ. President of the British Association, 1916-19. See Dr Joan Evans, *Time and Chance*, 1943, for further remarks on her father's career.

Evans, Caradoc (1878-1945), novelist, b. Pencyrocy, Llandyssul, Wales. At 14 he was apprenticed to a draper, and remained in the business for 12 years. Moving to London, he took classes at the Working Men's College and turned to journalism, eventually becoming editor of *T.P.'s Weekly*. His books were mainly bitter satires on his own land and people, and his first collection of stories, *My People*, 1915, was suppressed in Wales; it was followed by *Capel Sion*, 1916, *My Neighbours*, 1919, and *Pilgrims in a Foreign Land*, 1942. His novels include *Nothing to Pay*, 1930, *This Way to Heaven*, 1933, *Wasps*, 1934, and *Morgan Bible*, 1943; he also wrote a play, *Taffy*, 1925. In 1933 he married the Countess Barcynska, an Englishwoman who wrote novels as Oliver Sandys, and she wrote his life in 1946.

Evans, Dame Edith Mary (1888-), actress, b. London. D.B.E. 1946. She made her first appearance at King's Hall, Covent Garden (1912), in *Trilby* and *Cressida*. She has appeared in the plays of Shakespeare and Shaw and in revived Restoration drama—particularly Congreve's *The Way of the World*. Among her chief successes are *Mistress Page*, *Helena*, and *Nerissa* in Shakespeare's plays, *Millamant* in Congreve's play, *Lady Utterwood* in Shaw's *Heartbreak House*, and *Lady Bracknell* in *The Importance of Being Earnest*. Modern plays in which she has appeared include *Daphne Laureola*, *Waters of the Moon*, *The Park is Light Enough*, and *The Chalk Garden*.

Evans, Sir Edward Radcliffe Garth Russell, 1st Baron Mountevans (1881-1957), adm. and explorer, popularly known as 'Evans of the Broke'. E. was in the S.Y. *Morning*, relief ship in search of Capt. Scott's ship the *Discovery* (1902-4); was second in command of Scott's expedition to the S. Pole and succeeded Scott on his death. In the First World War he commanded a destroyer guarding the Straits of Dover and won fame in 1917 when his destroyer *Broke*, with *Swift*, defeated 6 Ger. destroyers which had crept through the fog to raid Dover. Capt. of H.M.S. *Carlisle*, 1921-3; of the battle-cruiser *Repulse*, 1926-7; rear-adm. in command of the Australian Navy, 1929-31; commander-in-chief, Africa station, 1933-1935; of the *Nore*, 1935-9. Awarded King Edward VII and King George V medals for Antarctic exploration and a score of times decorated for bravery.

London Regional Commissioner for Civil Defence, 1939-45. Created Baron Mountevans, 1945. Publications: *Keeping the Seas*, 1920, *South with Scott*, 1921, and *Adventurous Life*, 1946.

Evans, Sir George de Lacy (1787-1870), gen., b. Ireland. In 1815 he fought at Waterloo. He commanded the Brit. Auxiliary Legion during the first Carlist War in Spain. He also distinguished himself at the siege of Sebastopol and the battle of Inkerman in the Crimean War, for which services he received the thanks of the House of Commons in 1855 and was created G.C.B. For many years he was M.P. for Westminster.

Evans, George Essex (1865-1909), Australian poet, b. London, son of an M.P. Educ. at schools in Wales and in Guernsey, he emigrated to Queensland in 1881 and became district registrar at Toowoomba. His first book of verse, *The Repentance of Magdalene Despar*, 1891, was followed by *Lorraine and Other Verses*, 1898, and in 1901 he won a prize of £50 for his 'Ode for Commonwealth Day.' His last vol. of verse was *The Secret Key*, 1906. His *Collected Verse* was pub. in 1928.

Evans, Marian, see ELIOT, GEORGE.

Evans, Oliver (1755-1819), Amer. inventor, b. Newport, Delaware. He invented a machine for making wire card teeth (1777) used in carding cotton and wool, and is also noted for his improved machinery for flour-mills. E. is said to have invented the first steam engine, constructed on the high-pressure system, sending his drawings and specifications to England, 1795. He also made the first steam dredging machine of U.S.A. His project of a railway between New York and Philadelphia failed through lack of funds. E. has been called the 'Watt of America.' He wrote *The Young Millwright's and Miller's Guide*, 1795. See R. Thurston, *Growth of the Steam Engine*, 1878.

Evans, Robley Dunglison (1846-1912), Amer. naval officer; appointed to the Naval Academy from Utah in 1860. He was in command of the *Iowa* at the naval battle of Santiago in the Sp.-Amer. War, and was commander of the *Yorktown* at Valparaiso in 1891, where he earned the name of 'Fighting Bob Evans.' In 1901 he was made rear-adm., and in 1902 commander of the Asiatic fleet. He became commander of the Atlantic fleet in 1905, and in 1907 commander-in-chief of that fleet on tour of the world. *A Sailor's Log*, pub. in 1891, is his work. He retired from public life in 1908.

Evans, William (1811-58), landscape painter in water-colours, is usually known as 'Evans of Bristol.' A painter of Welsh scenery, one of his finest works is 'Troth Mawr.'

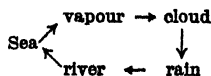
Evanston, residential and industrial city in Illinois, U.S.A., adjoining Chicago on the N., seat of NW. Univ. It is the national H.Q. of the Women's Christian Temperance Union, and the world H.Q. of Rotary International. Pop. 73,600.

Evansville, city in Indiana, U.S.A., on the Ohio R. (bridged) near Illinois border.

It is the railway and commercial centre of an agric. area. Manufs. include furniture, automobiles, refrigerators, and flour. It is the seat of E. College. Pop. 128,600.

Evaporation, or Vaporisation, is the process by which a substance changes into the state of vapour. Some solids, such as snow, camphor, iodine, etc., readily disappear in the state of vapour at temps. well below their melting points (see TRIPLE POINT, SUBLIMATION). The E. of a liquid may go on at all temps., but the rate of change is greater the higher the temp., until the boiling-point (q.v.) is reached, when 'free E.' occurs. The rate at which E. takes place depends (1) on the area of the surface exposed; (2) on the freedom from vapour of the space above the liquid; and (3) on the difference between the vapour pressure and the external pressure. Thus, taking a quantity of liquid, it will evaporate most rapidly if placed (1) in a shallow vessel; (2) in a draught, so as to remove the vapour as soon as formed; and (3) if heated, or placed under an exhausted receiver, the vapour pressure being increased in the former case, and in the latter the external pressure reduced. If a quantity of liquid is placed in an evacuated vessel, some of it will evaporate until the space above the liquid is 'saturated' with the vapour; equilibrium is then maintained, or in other words, E. and condensation take place at equal rates. For every temp. there is a maximum vapour pressure, which becomes equal to atmospheric pressure at the boiling-point of the liquid. The presence of another gas or vapour, such as air, has no effect upon the magnitude of the vapour pressure, but merely increases the time taken to arrive at the state of equilibrium. A large amount of heat is absorbed in the process of E., the remaining liquid and its surroundings being cooled, sometimes to a considerable extent. Thus, by placing a dish of water under the receiver of an air-pump, together with some sulphuric acid to absorb the vapour, the water may be frozen by rapidly exhausting the receiver. Again, by directing a spray of ethyl chloride upon animal or vegetable tissue, the latter is soon frozen by the cold produced by the rapid E. of the former, use being made of this for producing local anaesthesia in the case of small operations.

Evaporation in nature.—E. is constantly taking place all over the surface of the globe, but is most rapid in tropical regions, where the hot air is able to take up a large amount of moisture from the sea, lakes, and rivers. This water-laden atmosphere, when it condenses in a cooler climate, gives up some of its moisture in the form of rain, snow, or hail, according to the surrounding temp. Thus the water on the earth is undergoing a constant cycle of E. and condensation which may be represented as follows:—



Taking the W. of Europe, E. is rapid in spring and still more so in summer, and on the other hand, from Nov. to Feb. it is almost at a standstill, due to the falling temp. and consequent moisture-laden state of the atmosphere. Measurements of the annual E. have been made at various places, the following being a selection. Interior basin of the U.S.A. in lat. 36° N., 150 in.; Cumana, S. America, 136 in.; Madras, 91 in.; Co. Cavan, Ireland, 13 in.; and over a very large area in Europe less than 20 in. It has been found that in general the ann. E. and rainfall are approximately proportional.

Commercial applications of evaporation.—E. plays an important part in most manufacturing processes, and various means have been devised to facilitate the removal of moisture from solutions and substances. Thus brine is concentrated by being made to trickle down piles of brushwood, placed in a current of air, a large surface being thereby exposed for E. The same principle is applied to the coolers used in breweries and elsewhere, a stream of water being made to trickle over the pipes containing the warm liquid. Liquids like sugar, syrups, and various extracts are evaporated in vacuum pans, in which the external pressure is reduced as far as possible by suction pumps, so that E. will proceed fairly rapidly, even at a low temp. In freezing machines of the liquid ammonia type, the low temp. is produced by the rapid E. of the liquefied ammonia under reduced pressure. See also PHYSICAL CONSTANTS. See E. Rausbrand, *Evaporating, Condensing, and Cooling Apparatus*, 1933.

Evatt, Herbert Vere (1894—), Australian lawyer and statesman, b. E. Maitland, New South Wales, member of the House of Representatives since 1940, leader of the federal parl. Labour party and leader of the Opposition since 1951. He entered politics in 1925 as a member of the legislative assembly of New South Wales, retiring in 1930 to become a judge of the high court of Australia until 1940, when he re-entered politics as member of the House of Representatives for Burton, New South Wales. E. was attorney-general and minister for external affairs 1941–9 and deputy prime minister 1946–9. He was leader of the Australian missions to Washington and London 1942–3, a member of the Australian delegation to the U.N. conference, San Francisco, 1945, president of the S. Pacific regional conference, Canberra, 1947, and chairman of the Brit. conference on the Jap. peace treaty, 1947. Of particular note was his work with the U.N.O.; he was leader of the Australian delegation to the U.N. assembly, 1946–8, and president of the assembly for session 1948–9. In 1954 E. fought the general election with lavish promises of increased social benefits, but his party failed to gain power. In 1954 when a royal commission was appointed to investigate Petrov's allegations that a Soviet spy-ring involving Australians existed in Australia (see

PETROV AFFAIR) E. represented some of those accused by Petrov. His conduct throughout the affair was highly partisan and touched off a bitter quarrel within the Australian Labour party between the Right (chiefly Catholic) and Left factions. Sev. efforts to oust E. from the party leadership, 1955–6, were unsuccessful, however, though the quarrel seriously weakened the party as a whole, and in Dec. 1955 the Labour party lost ground in the general election. While Menzies (q.v.) supported the Anglo-Fr. action in Egypt, Oct.–Nov. 1956, E. was strongly hostile to it. His pubs. include *The King and his Dominions Governors*, 1936; *Rum Rebellion*, 1938; *Australian Labour Leader*, 1940; *Australian Foreign Policy*, 1945; *Australia in World Affairs*, 1946; *The United Nations*, 1949.

Eve, wife of Adam (q.v.) from one of whose ribs Gen. ii. 21–4 says she was taken, teaching in this way the unity of the species, the natural priority of the husband in the family (cf., 1 Cor. xi. 8 f.), indissolubility of marriage (cf. Mark x. 7), and mutual love of man and wife (Eph. v. 31). The name, E., given in Gen. iii. 20, is of uncertain and probably pre-Heb. Semitic origin. The Heb. margin explains it by *Haerah* 'Life,' and the Septuagint renders the name as 'Zoe' (so that the christian names Eva and Zoe are equivalents). E. is then described as the mother of all living, i.e. humans. E. was the first to fall, and the story of her temptation in Gen. is an accurate psychological study. The promise made in Gen. iii. 15, is the first Gospel, or prophecy of salvation in Christ, there described as the seed of the woman. E. is therefore the prototype of the Blessed Virgin Mary, as Adam is of Christ (1 Cor. xv. 45). A famous medieval hymn (Eng. Hymnal 213) makes play with the fact that Eva reversed gives us Ave, Gabriel's greeting to Mary.

Evection (Lat. *erectio*, carrying forward), a lunar inequality resulting from the oscillatory motion of the moon's apse line and also from the oscillation of the eccentricity of its orbit. The combined effect may alter the moon's long. by $\pm 1^{\circ} 17'$ with a period of 31.812 days. See LUNAR THEORY; MOON.

Evelyn, John (1620–1706), diarist, b. Wotton House, near Dorking, Surrey. He was educ. at Southover Free School, and went, in 1637, to Balliol College, Oxford, but came down in 2 years without a degree. He had some time before been admitted as a law student, and in 1640 he took up his residence in the Temple, though he never, apparently, thought of practising as a barrister. He was interested in horticulture, and improved the grounds of his father's estate at Wotton. From 1641 he travelled much on the Continent, but settled in England in 1652 at Sayes Court, Deptford, where he devoted much of his time to the lens, which he brought to a state of —h perfection. He was author of a celebrated work on sylviculture, entitled *Sylva, or a Discourse of Forest-trees*, 1664.

He did, indeed, do much to improve horticulture and introduce exotics into this country. He also wrote on a wide variety of subjects, including hist., religion, architecture, law, sculpture, navigation and commerce, medals, and salads and pub. sev. trans. of Gk. Lat., and Fr. authors. After the Restoration he held many minor offices and sat on various commissions. For a while he was secretary of the Royal Society, but twice declined the presidency. A friend of many notable people, including Pepys, he was *au courant* with most of the events of the day, which were duly recorded in his famous *Diary* which he kept from 1624 to 1706, and which was discovered in 1817 in an old clothes basket and first pub. in 1818 ed. by Wm. Bray. It is a mine of information about England and the Continent in his day. Later eds. are by J. Forster, 1850-2; H. B. Wheatley, 1879; A. Dobson, 1906; and (the first complete text) E. S. de Beer, 6 vols., 1954-5. See also H. Evelyn, *The History of the Evelyn Family*, 1915; Lord Ponsonby, *John Evelyn*, 1933; and bibliography by G. Keynes, 1937.

Evening Primrose, see OENOTHERA.

Evening Standard, London evening paper formed by an amalgamation in 1905 of 2 evening papers, the *Evening Standard* (founded 1827 as the *Standard*, q.v.) and the *St James's Gazette* (founded 1880). The *St James's Gazette* was from the first distinguished for its strongly literary character, and belonged rather to the category of reviews, though it was an ardent supporter of Imperialism. In 1923 the *E. S.* absorbed the *Pull Mall Gazette* (q.v.). The *E. S.* is now controlled by the Beaverbrook Foundations. The paper is notable for its political and social news and comment.

Evenki (old name **Tungus**), Tungus (q.v.) speaking people scattered over a vast area in Siberia, from the R. Yenisey to the Sea of Okhotsk; they numbered 38,000 in 1926. They are semi-nomadic and engage in fur trapping, fishing, and reindeer breeding. They have been known since the 14th cent., and have been subject to Russia since the 17th cent.

E. National District, formed in 1931, belongs to the Krasnoyarsk Kray (q.v.). Area 285,900 sq. m.: pop. c. 25,000, mainly Russians, about one-fifth E. It has large mineral resources (Tungus coal basin) hardly yet exploited. The cap. is Tura. See W. Kolarz, *Russia and Her Colonies*, 1952.

Everdingen, Aldert (Allart) van (1621-1675), Dutch landscape painter and engraver; studied under R. Savery and R. Molyn, surpassing both. He travelled in Norway and Sweden and excelled in sketches of rugged scenery, marine views, and storms. Among his best pictures are: 'Landscape with River,' c. 1648 (Louvre); 'Landscape with Waterfall,' 1650 (Munich); 'Wooded Slope,' 'Castle by River,' and 'Norwegian Waterfall' (Berlin Museum); 'Norwegian Landscape' (National Museum, Amsterdam); 'Storm at Sea' (Munich). His most famous

etchings are the series illustrating 'Heineke Fuchs.' Some of his original drawings are in the Brit. Museum.

Everest, Mount, or Chomolunga ('Goddess Mother of the World'), the world's highest mt., situated in the Himalaya on the frontier between E. Nepal and Tibet. The height, not yet precisely determined owing to the difficulty of determining mean sea-level under the mt., is over 29,000 ft. The conventional figure of 29,002 ft is the mean of 6 readings computed in 1852. Its name is derived from Sir George Everest, a surveyor-general of India. The 11 attempts to reach the summit have formed an epic story of human refusal to accept defeat. In 1921 a reconnaissance party was sent out from Britain by joint enterprise of the Royal Geographical Society and the Alpine Club. Operating from Tibet (Nepal refused entry), they surveyed the N. side and discovered a route up the N. ridge. In 1922 a climbing party followed this ridge to 26,700 ft, and another to 27,300 ft using oxygen. A third expedition in 1924 encountered terrible snowstorms, despite which Norton and Somervell climbed to 28,000 ft without oxygen, and Somervell alone to 28,130 ft. Mallory and Irvine then made an attempt with oxygen. They were last seen by Odell close to 28,000 ft, but were never seen again and their bodies have not been recovered. In 1933, aircraft flights of the Houston expedition were made over the summit by the Marquis of Douglas and Clydesdale and F. J. Lt. McIntyre. That same year a fourth climbing expedition from the N. enabled Wyn Harris, Wager, and Smythe to reach 28,100 ft without oxygen. The first named found Mallory's ice-axe. There were further, less successful attempts in 1935, 1936, and 1938. After the Second World War Tibet refused entry to Europeans, but in 1951 Nepal granted access to a Brit. expedition, which made a first reconnaissance from the S. of Everest's W. face. They discovered a new route up the Khumbu glacier leading to the S. col. In 1952 this route was followed by 2 Swiss expeditions, when Raymond Lambert and the Sherpa Tenzing Norgay reached 28,200 ft on the SE. ridge. The final Brit. attempt came in 1953 under the leadership of Col. John Hunt (q.v.). A distinguishing feature of this attack was the use of oxygen in bulk. On 29 May Edmund Hillary and Tenzing (qq.v.) reached the summit. See C. K. Howard-Bury, *Mount Everest, the Reconnaissance*, 1921; C. G. Bruce, *The Assault on Mount Everest*, 1922; E. F. Norton, *The Fight for Everest*, 1924; H. Rutledge, *Everest*, 1933, and *Everest—The Unfinished Adventure*, 1935 and 1936; H. W. Tilman, *Mount Everest*, 1938; *The Mountain World*, 1953 (ed. Marcel Kurz); John Hunt, *The Ascent of Everest*, 1953; W. H. Murray, *The Story of Everest*, 1953; W. Noyce South Col., 1954.

Everest (Mt) Foundation, a Trust Fund constituted by the Royal Geographical Society and the Alpine Club for exploration and research in mt regions. Limited

financial grants may be made to approved expeditions.

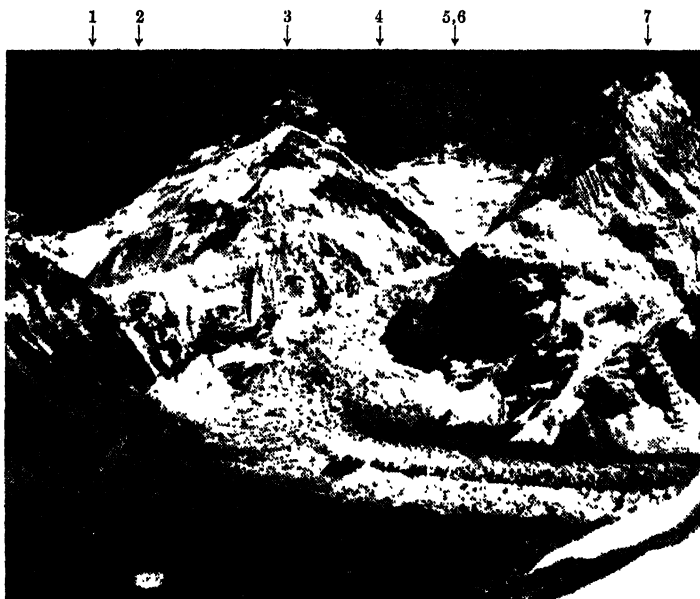
Everett: 1. Until 1870 part of Malden, 3 m. N. of Boston, U.S.A., now a city with important manufs., including iron and steel, coke products, chemicals, leather goods, furniture, electrical apparatus, paints, paper and wood products. Pop. 46,000.

2. Port city of Washington, U.S.A., 25 m. N. of Seattle on Puget Sound, with

bird life. Florida is sometimes called the Everglade State after this swampy dist.

'Evergreen State,' see WASHINGTON.

Evergreens, are those plants, shrubs, and trees which keep their leaves and do not shed them annually. The leaves sometimes live as long as 4 or 5 years on E. trees, but they are constantly shedding and making new ones, so that the trees are never left bare. In tropical climates certain trees that are deciduous when



Copyright, The Mount Everest Foundation

THE WEST FACE OF MOUNT EVEREST
from 20,000 ft on Pumori

- | | | | |
|---------------|----------------|-------------|---------------|
| 1. North Col. | 2. Lho La. | 3. Everest. | 4. South Col. |
| 5. Lhotse. | 6. West Basin. | 7. Nuptse. | |

a fine harbour and beautiful mt scenery, many lumber mills, iron works, and factories and salmon canneries. Pop. 33,849.

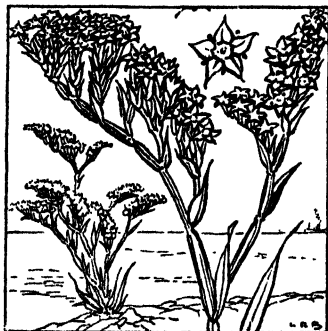
Evergem, small tn in the prov. of E. Flanders, Belgium, 4 m. N. of Ghent. It manufs. lace, linen and cotton goods, starch, and soap. Pop. 10,700.

Everglades, swampy subtropical region of S. Florida, U.S.A. It is 100 m. long and 50-75 m. wide, and consists of sawgrass, savannah, and water dotted by is. 'hammocks' with clumps of trees. It is frequented by numerous alligators, and has a rich variety of flora and animal and

grown in temperate regions are E.; as an example of this the *Robinia pseudacacia*, popularly known as acacia, may be quoted. All conifers except the larch are E., and many shrubs and creepers, e.g. box, laurel, ivy, are cultivated because they do not shed their leaves in autumn. See FORESTRY, TREE.

Everlasting Flowers are flowers which retain their form and colour for a long time after they have been picked and dried. A few genera of the order Compositae are among the best known, and sev. are cultivated in gardens for decorative purposes; they are often dyed bright

colours, and some are bleached white. *Antennaria dioica*, mt everlasting, or cat's foot, is the only Brit. species growing wild, but *Anaphalis margaritacea* is naturalised in S. Wales, Scotland, and the Channel Is. In gardens, *Ammobium alatum*, *Helichrysum*, *Helipterum*, *Waitzia*, and *Xeranthemum*, all provide flowers which, if gathered freshly opened, and hung to dry, heads down, keep well for up to 3 years. The Statice or Sea Lavender grown for drying is *Limonium*. See IMMORTELES.



EVERLASTING FLOWERS: STATICE

Eversley, vil. of NE. Hampshire, England. There is in the neighbourhood a fine old Jacobean residence, Bramshill House, which was built for the son of James I and is now a civil police college. Charles Kingsley (q.v.), the novelist, was rector of E. from 1844 until his death in 1875 and is buried in the churchyard. He founded the vil. school in 1853.

Evertsen, Dutch naval family which produced sev. distinguished officers, of whom 5 were brothers. Two of them were killed in action, viz. Vice-Adm. Cornelius in 1666 in the second battle off the N. Foreland; and Adm. Jan, in the same year in 'St James's Fight.' Cornelius, the son of Jan, attained the rank of vice-adm. and died in 1679. No fewer than 9 members of the E. family fell in action at sea.

Everyman, title of a popular morality play of the 15th cent. The characters are E., God, Death, Good Deeds, Knowledge, Beauty, Strength, and other abstractions. E. is summoned by Death, and all his friends forsake him, except Good Deeds. See A. C. Cawley (ed.), *Everyman and Medieval Miracle Plays*, 1856.

Everyman's Library, a comprehensive L. of the representative works of all time, initiated in 1906 and pub. at a popular price by Joseph Malaby Dent (q.v.) of the firm of J. M. Dent & Sons, Ltd., London, and imported into the U.S.A. and pub. there by E. P. Dutton & Co., Inc., New York. The name was suggested by Ernest Rhys, the general

editor (q.v.), whose cue was the line in the old morality play, 'Everyman, I will go with thee, and be thy guide.' It was the founder's intention that the L. should eventually reach the grand total of 1000 vols. and would constitute a cultural treasure house which would be within the reach of Everyman. Owing to conditions and events (including 2 world wars) outside the control of the publishers the numerical peak was not attained until 1956, the year of the L.'s golden jubilee. From its very beginning this bold enterprise was rewarded with widespread popularity, and the following are a few details of how it gradually took shape over the years.

As might be expected in a popular series, fiction began early to estab. its claims, with Lytton, Scott, Kingsley, George Eliot, Charles Reade, Trollope, Defoe, Fenimore Cooper, Marryat, and Dickens, and it is interesting to note that the first Brit. author to win a complete representation was Jane Austen (Nos. 21-5). By this time Tennyson and Browning were in the poetry section, Aeschylus, Euripides, and Plato were there to represent the classics in their formal sense, and Pepys, Gilbert White, and Benvenuto Cellini laid the foundations of the autobiographical form that was to become so popular in modern publishing. The second 100 was remarkable for some courageous publishing ventures, involving considerable risks at that time—a 3-vol. set of Shakespeare of nearly 1,000 pages per vol., a batch of no less than 21 long 'Waverley' novels, Grote's *History of Greece*, in 12 vols., Thierry's *Norman Conquest* in 2, Addison's *Spectator* in 4 long vols., and St Augustine of Hippo's *Confessions*. Herman Melville, then practically unknown in this country, was introduced to Brit. readers with *Moby Dick* and *Typee* and has gained ground ever since; Melville was only one among many Amer. authors including Emerson, Hawthorne, Washington Irving, and Oliver Wendell Holmes, whose claims were staked by John Macrae on behalf of Duttons, the New York publishers of the L. The third 100 was also notable for some large-scale ventures—15 more Dickens novels with the famous G. K. C. Introductions, especially hazardous because of their great length but none the less an extremely successful experiment, and a strong representation of Ruskin in no less than 13 vols., with the added complication of illustrations, a venture which does not seem to be so important now as it did then, although Ruskin still has his devoted admirers. Two famous books which have gained rather than lost in prestige and popularity since those days are to be found in this group—*Wuthering Heights* and *Vanity Fair*. Amongst them, too, are *Jane Eyre* and the well-beloved *Vicar of Wakefield*, *Little Women* and *Good Wives* (together in 1 vol.), de Quincey's *Opium Eater* and Bunyan's *Pilgrim's Progress*. From this point to the half-way mark the international

character of the L. began to make itself more apparent and the list is sprinkled with such great names as Dante, Cervantes, Goethe, Victor Hugo, Dumas, Daudet, Ibsen, Montaigne, Balzac—a European invasion which was to pave the way for the Russian heavyweights to follow. The classical foundation already laid was reinforced by Homer and Virgil.

The second lap of the marathon, numbers 501–1000, opened in 1911 with Dostoevsky's *Crime and Punishment*, the first to represent the Tolstoi-Dostoevsky-Turgenev triumvirate. The Russian steam-roller did not, however, in any way succeed in crushing such hardy European individualists as Rousseau, Pascal, Boccaccio, Rabelais, and Flaubert, an extra-insular cultural stream which culminated in the pub. of Manzoni's masterly lt. novel *The Betrothed*, number 999 in the series. Some new experiments were made, including the artistically risky but commercially sound one of including a number of near-contemporary celebrities such as R. L. Stevenson, Samuel Butler, Oscar Wilde, John Galsworthy, Joseph Conrad, D. H. Lawrence, G. K. Chesterton, Hilaire Belloc, H. G. Wells, W. H. Hudson, Richard Jefferies, Arnold Bennett, Somerset Maugham, and J. B. Priestley. E. L. serves to throw a most interesting light on the changes that have taken place in the standards of 'immortality' during the 50 years of its growth. Some of the great Victorian novelists are no longer so solidly estab. as they at one time appeared to be and the materialist philosophers have wobbled on their pedestals. Poetry and plays are more popular than essays and belles-lettres, and standard histories, as distinct from biographies, have lost ground—evidently hist. needs rewriting for each generation. With this evidence of the fickleness of fame in mind it was natural that when the time came to select the thousandth vol. editorial policy should favour a work whose claim to permanence none could deny. Inevitably there were few such candidates at that stage, but there was one book which is recognised throughout the world as of basic importance in the hist. of civilisation, especially of Christian culture, and which had not hitherto been included because of its intrinsic textual difficulties, Aristotle's *Metaphysics*. After consultation with Sir David Ross, the leading contemporary Aristotelian, it was decided to attempt a new translation and re-arrangement of the text that would render it easily comprehensible to the E. reader. The editing and translating were entrusted to the classical and philosophical scholar, John Warrington, whose version made its first appearance in March 1956.

Previously incorporated in the L., but later an independent offshoot in an appropriately more generous format, is E. Reference L., which forms a valuable companion to the great range of the main series, and provides the reader with an equipment which will aid him in its interpretation and use. The aim of

this offshoot, which started with the enlarged 12-vol. *Everyman's Encyclopaedia*, now reissued in this present (4th) ed., was to offer a reliable set of reference books covering all that anyone except a specialist was likely to require. Two of the vols., both newly compiled by D. C. Browning, supply an ideal background to the literary side of E.: the *Dictionary of Quotations and Proverbs*, already a well estab. favourite, serves both as a guide to literature and as a fascinating study in its own right, and the *Dictionary of Shakespeare Quotations*, a book similarly planned and devoted exclusively to the greatest of Eng. writers because of the unique place he holds in world literature. The Gk and Rom. classics are exhaustively covered in the *Smaller Classical Dictionary* and the *Atlas of Ancient and Classical Geography*, and a parallel vol., the *Dictionary of Non-classical Mythology*, elucidates the background of Eastern, Egyptian, Celtic, and Norse legend. Hist. generally is summarised for reference purposes in the *Dictionary of Dates*. Eric Blom's *Dictionary of Music* is devoted to the most international of all the arts, and the practical aspects of the writer's and reader's requirements are catered for by *Everyman's English Dictionary* and Roget's *Thesaurus*, the latter essentially a 'dictionary in reverse,' a word finder and an idea finder which has proved its value to 3 generations of writers.

E. L. is a dynamic, not a static, creation—a wood of a thousand trees rather than a cemetery of a thousand monuments. Its success necessitated the estab. In 1906 of Dents' factory, the Temple Press (later the Aldine Press) at Letchworth, Hertfordshire, the firm's City premises at that time being no longer large enough to cope with the immense requirements of the L. Binding at Letchworth began at the end of 1906, and 2 years later the factory was enlarged by the installation of a printing plant. To-day almost all the vols. are bound at Letchworth and most of them are also printed there. By the end of 1956, the 'golden jubilee' year of E. L., the total sales, including the reference L., were nearly 50,000,000 copies.

Eves, Reginald (1876–1941), painter, b. London, studied art under Legros, Frederick Brown, and Henry Tonks at the Slade School. In 1899 his picture 'Waiting' was accepted for the Royal Academy. E. became a regular exhibitor at the Royal Academy, Royal Society of Portrait Painters, the Salon, and elsewhere, specialising in portraiture. The National Portrait Gallery acquired his 'Thomas Hardy' in 1931. Other portraits in the same gallery are those of Shackleton and Jellicoe and, in the Tate Gallery, are portraits of Sir Frank Benson and Sir Max Beerholm. Among his portraits of women are those of the Queen of Spain and Miss Julia Nelson. If he lacked charm of colour, he had a fine feeling for character.

Evesham, municipal bor. and mkt tn of Worcestershire, England. It is situated

on the r. b. of the Avon, on the fringe of the Cotswolds, 15 m. S.E. of Worcester. The extreme fertility of the soil renders the neighbourhood most suitable for market gardening, which is the chief industry. There is a fine bridge over the riv., here navigable, also a library, technical college, hospital, etc. In a battle fought here in 1265, by which Henry III regained the throne and the barons were crushed for a time, the prince of Wales defeated Simon de Montfort, earl of Leicester. E. is noted for its abbey founded in 701, a magnificent detached belfry (q.v.), built in the 16th cent., 110 ft high, and containing a clock with chiming and 12 bells, which still remain, also a mutilated gateway of the 12th cent., a fine arch, and the abbot's stables. Pop. 12,066 (1954).

Eviction, in law, means the ejection of a person from possession of lands or tenements. E. may be total or partial, an instance of the latter being where some other person sets up a claim to a right of way or other easement over the land. Entry by a landlord to view the state of repair, or to effect alterations, is not E. or trespass if the tenant agreed to allow the landlord to enter for such purposes. To maintain an action for damages for E. physical expulsion need not be proved, any act tending to prejudice the quiet enjoyment or comfort of the tenant being an E. or *constructive* E. The remedy for E. is generally an action of damages for breach of a covenant (q.v.) for quiet enjoyment, and an action of ejection to recover the land (*see* ENTRY); but when there is no contractual relationship between the tenant and the person evicting him, an action of damages for trespass would be the appropriate remedy, and if the evictor acted without colour of right, the tenant would recover heavy damages. In the case of a house protected under the Rent Restriction Acts, the Courts require satisfaction on sev. essential points before they will grant an E. order. *See also* RECOVERY OF LAND.

Evidence. Legal E. denotes the means by which facts are ascertained for judicial purposes. It is a branch of the law of procedure, but there exists no general or codifying Act, and indeed it is probably undesirable that judicial discretion in the matter of reception of E. should be so fettered. Sir James Fitzjames Stephen was employed in 1872 to draw a code for England, but the code drawn never passed into law, although its model, drafted by the same judge, subsequently became the Indian Evidence Act of 1872. The whole of our law of E. as it exists now is a system of restriction upon the admission of testimony, and, based as it is upon the formal rules of inductive logic, reveals a strong tendency to narrow the freedom which formerly characterised, especially in state trials, the conduct of judicial proceedings. The bulk of the rules of E. is negative in character. That part of the law of E. which relates to *relevancy* of facts as distinct from *mode of proof* of a fact deemed to be relevant is dominated by 4

primary rules of exclusion, or rules which (subject to certain important exceptions) exclude the admission as E. of facts which outside legal circles might well be regarded as affording excellent testimony. These rules include the following 4 classes of facts: (1) Facts similar to, but not specially connected with, each other; e.g. if the issue is whether A forged B's signature to a cheque, the fact that he forged C's signature on some former occasion is irrelevant. But if there is a question whether an act was done intentionally or accidentally by A, the fact, if so, that such an act formed part of a systematic course of conduct would be relevant; e.g. if A is suing on a policy of fire insurance, the fact that he had sustained fires in other houses insured by him would be relevant to the issue, whether the fire was accidental or not. (2) The fact that a person not called as a witness has asserted the existence of any fact. This is the fundamental principle which is more popularly expressed in the maxim that hearsay is no E. The most striking exceptions to this rule are afforded by the various rules of convenience which allow of the admission of statements by deceased persons (as to which *see* DECLARATIONS OF DECEASED PERSONS), and statements which amount to admissions. Admissions may be E. against a party to an action when made on his behalf by any person who has a substantial interest in the event of the proceedings, or who is an agent expressly or impliedly authorised by that party to make such admissions. But admissions made 'without prejudice' can under no circumstances be adduced in E. The rule against hearsay renders irrelevant statements in books or documents not made by parties to the proceedings or their authorised agents. Exceptions to this rule excluding documentary E. include, *inter alia*, entries in public records, official books, or registers; recitals of public facts in statutes and proclamations, and statements in works of hist. Final judgments, orders or decrees of any court are always E. as against all persons of all facts stated or decided by such judgments, etc., or upon which they are based, but not of facts which may only be inferred as probable from their existence. (3) The fact that any person is of opinion that a fact exists. Fact, not opinion, is what a witness is in general required to state. But the opinions of experts on points of science or art are admissible in E., subject to the judge's decision on their competence as experts. As a matter of law judges have full power on all technical matters to call in the aid of judicial assessors, but except in Admiralty cases they seldom avail themselves of their statutory powers. (4) The fact that any person's character is such as to render conduct imputed to him probable or improbable. E. of character may, however, be given in criminal trials in certain circumstances stated in the Criminal Evidence Act, 1898. That Act allows the prosecution to give E. of a prisoner's bad character if the prisoner has himself or by his counsel given E. to

establish his own good character, or has at the trial cast imputation on that of the prosecutor or witnesses for the prosecution. E. of previous convictions may be given before the verdict (a) if proof of such former offences is admissible on other grounds, e.g. as showing a systematic course of conduct (see above); (b) to rebut E. of good character.

E. is said to be either oral or documentary. Documentary or written E. consists of records, documents under seal, such as charters and deeds, and writings not under seal. Bentham used the term real E. to denote such E. as was neither oral nor documentary in the above special sense; but E. which is not oral is generally classified, even if unscientifically, as documentary. Acts of Parliament are records of the highest nature, from their quality as the memorials of legislation; but a distinction is made with respect to E. between public and private statutes. A public statute requires no proof in courts of justice; but private Acts must be proved by copies compared with the original roll of Parliament. Records of the proceedings of courts of justice are proved by exemplifications, sworn copies, and office copies. Exemplifications are transcripts of the records of different courts, accredited by having the seals of such courts attached to them. Sworn copies are transcripts made by individuals who authenticate them upon oath when they are produced in E. Office copies are copies certified to be true and accurate by an officer expressly entrusted with that business. The reception of various certificates, official and public documents, is regulated by various statutes, especially the Evidence Act, 1845. Charters and deeds are proved by the production of the instrument and proof of the execution by the party to be charged with it; but where the document is more than 30 years old the execution need not be proved. The general rule is that the original deed must be produced. Deeds attested must, in general, be proved by one at least of the attesting witnesses; but if the witnesses be dead, or cannot be found, the execution may be proved by proof of the handwriting of the party. The method adopted to prove handwriting in general is to secure the testimony of some person acquainted with the handwriting of the individual in question, or who has seen him write, or who has had written correspondence with him; but otherwise the testimony of persons skilled in calligraphy as 'experts' is wholly ex-

Evidence Act, 1898, both the accused and the husband or the wife of the accused are competent witnesses; but the principle that the accused is not compelled to incriminate himself is preserved by the provision that such witnesses are not compelled to give E. except that the wife or husband of accused may be called either for the prosecution or the defence, and without the consent of the accused, if he (or she) is charged with any offence under the Vagrancy Act, 1824 (neglect to maintain wife and family), Offences against the Person Act, 1861 (relating to rape, indecent assault, and the like offences), the Married Women's Property Act, 1882 (offences by a married man or woman against the other spouse's property), and the Criminal Law Amendment Act, 1885 (sexual offences). E. must be given on oath unless the witness objects to being sworn, upon the ground that he has no religious beliefs, when he may instead solemnly affirm in the Scottish fashion. Children of tender years who do not understand the nature of an oath may give E. without being sworn if the judge thinks the child sufficiently intelligent to give E. and to understand the moral obligation of speaking the truth.

The only change for many years in the principles of the law of E. is that introduced by the Evidence Act, 1938, which admits documentary E. in civil proceedings in order to establish facts on which direct oral E. would be admissible. But such E. is only admitted where the maker of the documentary statement either had personal knowledge of the matters therein dealt with or, if he had not, the document is part of a continuous record and he made the statement in the performance of a duty to record information supplied to him by a person who might reasonably be supposed to have personal knowledge of the matters recorded. But in either case the maker of the statement must be called as a witness. The court may, in order to avoid undue expense or delay, admit such a statement in E. notwithstanding that the maker of it is available but is not called, and in these circumstances the court may accept a certified copy of the original document. But nothing in the Act will render admissible as E. any statement made by a person interested at a time when the proceedings were pending or anticipated. It is for the court to decide what weight is to be attached to such statement, regard being had to the question whether the statement was or was not made contemporaneously with the occurrence or existence of the facts stated, and to the question whether or not the maker had any incentive to conceal or misrepresent the facts. See Stephen, *Digest of the Law of Evidence*, 1876; Taylor, *The Law of Evidence*, 1920; S. L. Hipson, *Law of Evidence*, 9th ed. 1952; G. D. Nokes, *An Introduction to Evidence*, 2nd ed. 1956.

Practically all persons are competent to give E. at the present day. Formerly plaintiffs and defendants were not allowed to give E. on the ground that they were interested parties, the result being that probably the best possible E. was excluded. Where the judge decides that any witness is too young or mentally infirm to testify, the witness is incompetent to give E. In certain cases witnesses may claim a privilege (see CONFIDENTIALITY IN LAW). Since the passing of the Criminal

Evil has no positive existence. It is the privation of good, rather than the mere absence of it, e.g. it is a physical E. for a man to be blind, since it is

natural for him to see, and it is a spiritual E. for a man to refuse to do what he knows to be good. The existence of E. is one of the everlasting problems both of theology and philosophy—how to account for it, and what to infer from it; and in accordance with the significance attached to it, philosophy inclines to an optimistic or pessimistic view of the world, or, further, an attempt to compromise between the two. The last theory would explain E. as warring against the triumph of good, and is thus of a dualistic character. J. S. Mill, in his *Essays on Religion*, regards this as a plausible explanation of the mixture of good and E. in the world. The difficulty of explaining E. is theological rather than scientific, it being often stated that for science there is no E. in the universe. The teachings of Freud (q.v.) and the psychoanalysts on the origin of the 'sense of guilt' are of interest in this connection, but the recent tendency of scientific thought is to recognise its limitations, and to leave moral questions to the theologians.

Evil Eye, the belief that certain people possess the power of injuring, bewitching, and even killing by a glance from the eye. Children and young people are supposed to be particularly susceptible, and any unexpected calamity befalling a child may be accounted for by its having been 'overlooked.' The glance of a person suffering from any physical calamity, such as a cast in the eye or a squint, is regarded as particularly dangerous. The power is supposed to be involuntary in many cases and not cultivated with evil intent. Few of the old classic writers fail to refer to it, and the wearing of amulets or charms against it was universal. Envy was supposed by many to be the impulse of the E. E., and it was therefore looked upon as unfortunate to have one's possessions praised unduly, the prosperous in particular having reason to fear it. The E. E. may affect animals as well as children. It is still a common belief in Africa and the East.

Evil-Merodach, Awel, or Amel-Marduk ('man of Marduk'), king of Babylon (562-560 BC), son and successor of Nebuchadnezzar. He released Jehoiachin, king of Judah, from prison in the 37th year of his captivity (see 2 Kings xxv. 27). He was killed in a rebellion led by his brother-in-law, Neriglissar (Nergalsharezzer), who seized the crown in his stead. Berosus (q.v.) (3rd cent. BC) speaks of him as an arbitrary and unwise ruler.

Evoll, see EBOLI.

Evolute, see CURVES.

Evolution (Lat. *evolutio*, an unrolling), literally, the process of opening out or unfolding what is wrapped up. In biology it encompasses the process by which primordial life has developed by successive stages into the multiplicity of animal and plant life, extinct and existing, and implies that the potential for this development existed in that primordial life. Herbert Spencer's definition is as follows: 'Evolution is an integration of matter and concomitant dissipation of motion; during

which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation' (*First Principles*, pt. II, chap. xvii). The theory of E., first started by C. Bonnet in 1762, is the hypothesis that the germ, instead of being brought into existence by the process of fecundation, is developed from a pre-existing form which contains the rudiments of all parts of the future organism. This theory (also called the theory of preformation) is directly opposed to that of 'epigenesis.' This latter view, which originated with Aristotle, was supported in the 18th cent. by C. F. Wolff, who believed that development came about through a series of new formations and transformations, and 'epigenesis' entirely superseded the old evolutionist theories of Bonnet, until they were revived in a more refined form in the 'germplasm' theory of Weismann. It is shown that the ovum cannot be entirely undifferentiated, as parts of the adult organism may be traced back to corresponding parts in the embryo. E., however, in this sense is only a branch of embryology (q.v.). The word is more generally applied to the development of matter from its simple unorganised condition—or even from the electron-systems called atoms from which matter itself evolved—to the present structure of the physical universe. This is called Inorganic E. and its main direction is towards the 'degradation of energy, for in every transformation of Inorganic matter some energy is wasted. Living matter is a more complex form of inorganic matter, and the living may be said to have originated from the non-living. Setting aside the possibility of spontaneous generation, substances gradually assumed the properties of living matter through the medium of colloidal compounds of carbon which form the proteid common only to plant and animal life. Organic E. traces the development of simple unicellular forms called the Protista to more complex multicellular forms, from aquatic forms to terrestrial, from invertebrates to vertebrates, and from mammals to man (see BIOLOGY).

The theory of E. is especially associated with the name of Charles Darwin (see DARWINISM), but it had been foreshadowed by Aristotle among the Greeks, and by Linnaeus and Buffon, Erasmus Darwin, and Lamarck in the 18th and 19th cents. A group of Catholic Darwinists also appeal to St Augustine's teaching of 'rationes seminales.' The evidence for organic E. lies in the study of fossils (palaeontology), the similarities in development and in structure of certain animals (and plants), and in the facts of their geographical distribution; there is also direct evidence from general chemical relationship in higher animals.

In the sphere of idealist-philosophy Hegel developed the moral and abstract element of his philosophy of spirit in correlation with the idea of E. Apart from the fact of E., various theories as to its

method have been propounded—the theory of inheritance of acquired characters by Lamarck and that of natural selection by Darwin and Russel Wallace. In addition, there is the theory of orthogenesis that evolutionary change follows definite and predetermined directions, and also Cope's theory of kinetogenesis or 'mechanical genesis.' In so far as orthogenesis E. tends towards the development of the 'highest' type, it has not been a straight ladderlike process, but one of slow experiment and frustration, as is shown by the study of palaeontology. In fact, E. does not show any tendency to produce a high type, only a number of types, and it is only in relation to the peculiar position of the conscious Mind of man that orthogenesis in the sense of evolving 'upwards' can be applied strictly. We must assume, however, that something of the same nature as Mind is inherent in all living organisms, but in the course of E. new properties arise. Such E. Bergson calls 'creative,' and Lloyd-Morgan 'emergent.' It must be borne in mind that E. as a theory cannot adequately explain the cause of such emergencies; it only professes to show their relation to preceding and succeeding emergencies. Before the emergence of Mind in man, E. was operated by the blind purpose of adapting types to their environment and of insuring the survival of those best adapted, but with the beginning of what is called the 'psychozoic period' Mind became dominant, and, with Mind, values, and subsequently ethical values, came into being. Man is the agent of a self-conscious E. which, as Thomas Huxley points out in *Evolution and Ethics*, is at variance with the non-moral cosmic process from which he himself has evolved. We may hold, however, that a self-conscious ethical E. will be the central fact of future development. Whereas before Mind the direction of E. was decided by environment, Mind enables man to control this and, in the words of L. T. Hobhouse, 'to grasp the conditions of his development that he may master and make use of them in his further growth.' In connection with purpose in E. we may recall T. H. Huxley's definition of a species: 'In most cases a species can be regarded as a geographically definable group, whose members actually interbreed or are potentially capable of interbreeding in nature, which in nature does not interbreed freely or with full fertility with related groups, and is distinguished from them by constant morphological differences.' Huxley, therefore, gets rid of the idea of purpose from the universe but believes in 'biological progress.' He detects no purpose in past E.: 'The purpose manifested in evolution, whether in adaptation, specialisation, or biological progress, is only an apparent purpose. It is just as much a product of blind forces as is the falling of a stone to earth or the ebb and flow of tides. It is we who have read purpose into evolution, as earlier men projected will and emotion into inorganic phenomena like a storm or earthquake. If we wish to work towards a

purpose for the future of man, we must formulate that purpose ourselves. Purposes in life are made, not found.' Commenting on these statements, Julian Huxley says: 'But then if it be admitted that, through the mechanism of natural selection, there is purpose in the universe, can we resolve the difficulty offered by apparent examples of fiendish purpose, by the thought that we, with our high level of consciousness, may be reading into the lower levels feelings which do not there exist? Or must we appeal, with the theologians, to a fundamental falling away of the universe from its destined purpose—in short, to Original Sin?' (See Julian Huxley, *Evolution: The Modern Synthesis*, 1942.) See also ANTHROPOLOGY; BIOLOGY; DARWINISM; MAN. The method of E. has long ago superseded the *a priori* in the writing of hist.; one of the most brilliant expositions of the method in this sphere was the work *Ancient Law* by H. S. Maine, 1861.

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Évora: 1. Dist. of S. central Portugal, in Alto Alentejo prov. (q.v.). It is bounded on the E. by the R. Guadiana (q.v.) and Spain. There are cork-oak forests, and cereals, olives, and vines are produced. Area 2853 sq. m.; pop. 219,650.

2. (anc. *Liberalitas Julise*; *Ebora*) City of Portugal, cap. of the dist. of E. and of the prov. of Alto Alentejo, 70 m. ESE. of Lisbon (q.v.). It became a bishopric in the 4th cent., and was an important trading tr. under the Moors. In the 15th and 16th cents. it was a seat of the Portuguese court. From the 16th to the 18th cents. it had a Jesuit univ. E. is surrounded by anc. walls, and has picturesque streets and squares. Its 12th-cent. archiepiscopal cathedral has a fine Gothic cloister. The aqueduct and the ruined temple of Diana probably date from the 2nd or 3rd cents. The city is a market centre for the Alentejo lowland, and has manufs. of cotton, hats, and metal goods. Pop. 25,400.

Évremond, Saint-, Charles Marguetel de Saint-Denis (1613–1703), Fr. writer, b. at Saint-Denis in Normandy, and educ. at Clermont, Caen, and later at the Collège d'Harcourt in Paris. He afterwards entered the army, and fought with distinction in the Thirty Years War, seeing much service in the Netherlands. He had to flee, however, in 1661, first to

Holland and thence to England, where he received a cordial welcome from Charles II and became the chief figure of the salon of the duchess of Mazarin in London. His fame as a Fr. writer and wit is notably illustrated in his *Conversation avec le Père Canaye*, and *Lettre sur la Paix des Pyrénées*; his writings include political essays (*Réflexions sur les divers génies du peuple romain*, 1663), literary criticism (*De la tragédie ancienne et moderne*, 1672, and *Sur les poèmes des anciens*, 1685), sev. comedies, and the charming letters to Ninon de Lenclose. Although he lived for the best part of 40 years in England, he never learned Eng. and was unacquainted with Shakespeare. He was buried in Westminster Abbey. A *Choix d'Oeuvres* was ed. by R. de Planhol, 3 vols., 1927. See M. Wilmotte, *Saint-Evremond, critique littéraire*, 1921. A. M. Schmidt, *Saint-Evremond, ou l'humaniste impur*, 1932.

Evreux (anc. *Civitas Eburowicum*), Fr. tn, cap. of the dept of Eure, on the R. Iton. The cathedral, parts of which date from the 12th cent., has notable 13th cent.-16th cent. stained-glass windows. There are Rom. remains near by, including an aqueduct, palace, and theatre. E. manufs. millinery, and has engineering and chemical industries. The tn was greatly damaged in the Second World War. Pop. 20,400.

Ewald, Heinrich Georg August (1803-1875), famous Ger. Orientalist and biblical critic, b. at Göttingen. He was prof. of philosophy and Oriental languages at Göttingen, 1827-37; prof. of theology at Tübingen, 1838-48; and again at Göttingen, 1848-67. He lost his position for a time for political reasons, in 1837 and 1867. His first book on *Genesis* appeared in 1823. E.'s greatest work was *Geschichte des Volkes Israel bis Christus*, 1843-59, trans. into Eng. 1867-86. Other works are *Kritische Grammatik der hebraischen Sprache*, 1827, *Die Poetischen Bücher des alten Bundes*, 1835-9, *Die Propheten des alten Bundes*, 1840, *Die Altertümer des Volkes Israel*, 1848, *Die Lehre der Bibel von Gott*, 1871-6. Many of his works have been trans. into Eng. See T. W. Davies, *Heinrich Ewald*, 1903.

Ewald, Johannes (1743-81), Dan. poet, b. Copenhagen, son of a pastor. In 1764 he wrote an allegorical poem entitled *Lykkens Tempel*, which was well received, but his lyrical power is best shown in the biblical drama, *Adam og Eva*, 1769, and in the lyrics *Til Sjælen* and *Til min Møkte*. His most beautiful work, the opera *Fiskerne*, was written in 1778, containing a song called 'Kong Christian stod ved højen Mast,' which has become the national song of Denmark. E. is among the greatest of Dan. lyrical poets. See K. Flor, *J. Ewald*, 1943; S. Thomsen, *J. Ewald, En Digters Livshistorie*, 1943.

Ewart, James Cossar (1851-1934), zoologist, educ. at Penicuik and Edinburgh. He became prof. of natural hist. at Aberdeen in 1878, and regius prof. of natural hist. at Edinburgh Univ., 1882. He started the marine biology station near

Aberdeen in 1879, and became a member of the Fishery Board for Scotland in 1882. His works include: *The Locomotor System of the Echinoderms* (with Romanes), 1881, *On the Preservation of Fish*, 1887, *Guide to Zebras, Hybrids, etc.*, 1900, *On a Pre-Jurassic Hybrid*, 1907, *The Development of the Horse*, 1915, *Moulting of the King Penguin*, 1917, *The Nesting Feathers of the Mallard*, 1921.

Ewart, William (1798-1869), politician, educ. at Eton and Christ Church, Oxford. He first entered Parliament in 1828 and was a prominent Radical and free trader. He was largely responsible for the passing of the act limiting capital punishment, 1837, and in 1850 carried a Bill establishing public libraries. Wm Ewart Gladstone (q.v.) was named after E.

Ewe, group of negro people in Togoland, W. Africa, incorporated with Ghana following a plebiscite in 1956 when 93,000 voted for incorporation and 67,000 against. The E. tribe is spread over parts of Fr. Togoland. Their culture is similar to the Ashanti. They are a pagan people.

Ewell, Richard Stoddert (Stoddard) (1817-72), Amer. soldier on the Confederate side in the Civil war. He graduated at West Point in 1840. In the Mexican war (1847) he was present at Contreras (q.v.) and Churubusco (q.v.). He helped to suppress the outbreak of the Apache Indians in 1857, and resigning his commission on the outbreak of the Civil war, 1861, served under 'Stonewall' Jackson. E. commanded a div. near Richmond (1862) and a corps of Lee's army at Gettysburg (1863). He was badly wounded at the battle of Bull Run (1861), and at Warrenton Turnpike. He was also present at Winchester, the Wilderness, and Spotsylvania Courthouse (1864). Captured by Sheridan at Sailor's Creek, near Appomattox R., in 1865, he lived in retirement after the war. See P. G. Hamlin, *Old Bald Head*, 1940.

Ewing, Sir James Alfred (1855-1935), civil engineer, b. Dundee; in 1881 he pointed out the phenomenon of *hysteresis*, or the lagging of magnetic effects behind their causes. He was prof. of mechanical engineering at the Imperial Univ., Tokyo, 1878-83; at Univ. College, Dundee, 1883-1890; at Cambridge Univ., 1890-1903 (Rede lecturer there, 1904). He was director of naval education, 1903-16; a member of the Ordnance Research Board, 1906-8. During the First World War he was in charge of the cipher dept of the Admiralty. He was awarded the Albert medal, 1929. His pubs. include: *Treatise on Earthquake Measurement*, 1883, *Magnetic Induction in Iron and other Metals*, 1891, *The Steam Engine and other Heat Engines*, 1894, *The Strength of Materials*, 1899, *The Mechanical Production of Cold*, 1908, *Thermodynamics for Engineers*, 1920, *The Physicist in Engineering Practice*, 1923.

Ewing, Juliana Horatia Orr (1841-85), writer for young people, b. Ecclesfield, Yorks, daughter of Margaret Gatty, to whose pub., *Aunt Judy's Magazine*, she largely contributed. She married Major E. in 1867, and to this may be attributed

her interest in soldiers, as exemplified in many of her tales. Amongst her delightful stories of child-life may be mentioned: *Mrs Overthway*, 1869, *The Brownies and Other Tales*, 1870, *A Flat Iron for a Parthing*, 1872, *Jan of the Windmill*, 1876, *Old Fashioned Fairy Tales*, 1882, *Jackanapes*, 1883, *Snapdragon and Old Father Christmas*, 1888, and *Verses for Children*, 1888. See life by H. K. F. Eden (her sister), 1886; also C. Maxwell, *Mrs Gatty and Mrs Ewing*, 1949.

Ex Cathedra. The pope speaks *ex cathedra* when in virtue of his office he defines a doctrine concerning faith and morals; hence the phrase has come to be used for any authoritative and official announcement.

Ex Libris, see BOOKPLATES.

Examination, in evidence, denotes the interrogation upon oath of witnesses. E.-in-chief means the interrogation of one's own witnesses; cross-E., that of the opposing witnesses; and re-E., that of one's own witnesses after they have been cross-examined. In E.-in-chief counsel is not entitled to put leading questions, that is to say, questions which suggest the answer expected. In cross-E. there is no such limitation, or, indeed, any other limitation than that imposed by the discretion of counsel himself or the presiding judge. Questions in re-E.s can only be put upon matters arising out of the cross-E.; the object of re-E. is to rehabilitate a witness whose testimony has been shaken in cross-E., but leading questions may not be put any more than in E.-in-chief. On application to a judge in chambers, leave may be obtained to examine witnesses abroad, by the process called taking evidence on commission. See also EVIDENCE.

Examinations. Educational E. as now held have evolved from those of the medieval univs. Since univs. were then guilds of learned men whose craft was teaching, E. were designed to ascertain fitness to teach. An admitted aspirant for fellowship of a guild was recognised as a bachelor. After some experience of teaching and further tests a successful aspirant was known as a doctor, master or prof. Among the earliest univ. tests of which we know details were those held at Bologna in the 13th and 14th cents. They consisted of private *viva voce* E. and public 'conventus' or delivery of a speech and maintenance of a thesis against opponents. The same principle obtained in the more complicated system in vogue at Paris. The public defence of a thesis is still part of the practice in some European univs. So too is the conferment of a mastership, M.A., as the 1st degree. This also prevails in Scotland. But in Oxford and Cambridge the Bachelorship grew to be the determining test. Mastership, carrying with it the full privileges of membership of the Senate, follows the B.A. without further examination after a specified period of time after matriculation (q.v.) (31 terms or 7 years at Oxford). Written E. were introduced at Oxford and Cambridge during the 18th cent.; practical tests in subjects like medicine

and science were later innovations. In practically all countries which have been influenced by Eng. developments the Bachelor's degree is the first and in many ways the most important. At Oxford the stages are: Responsions or 'Smalls,' Moderations, and Finals (Pass and Honours); at Cambridge they are the Previous E. of 'Little-Go' and the Tripos E. in 2 parts. London Univ., which was at first simply an examining body, grants internal and external degrees. For many years the stages were: Matriculation, Intermediate, and Final E. for the Bachelor's degree. Now, as in the civic univs., entrance is granted on the candidates' results in the General Certificate of Education. This examination superseded (1951) the School and Higher School Certificate E. Papers are set at 2 levels, the Ordinary and Advanced. All subjects are optional and there are no group requirements. Univs., and in some cases faculties, lay down entrance requirements. The E. are conducted by approved examining bodies (there are 8 of these run by various univs.). These E. have become widely recognised by professional bodies for the purpose of exempting candidates from entrance and other E. In a general way success in them is regarded as the criterion of the satisfactory completion of a secondary school course. There are, however, other examining bodies which are more concerned with technical and professional education (see TECHNICAL EDUCATION; COMMERCIAL EDUCATION; and EDUCATION). Professional organisations have their own E., exemptions from parts of which may be granted to holders of degrees. Appointments to some branches of the Civil Service are made on the basis of competitive E. The question of the actual value of E. is a vexed one. At the moment the same E. can be used for sev. different purposes. It might be used to judge what a candidate has learned from his course; it might be used to predict future academic success; or it might be used as a basis for predicting subsequent professional achievement. The conditions under which E. are taken often militate against their discovering what the examiners wish to know. They are often used in fact as occupational or educational selective devices. See C. Valentine, *The Reliability of Examinations*, 1932; P. Hartog and E. Rhodes, *Examination of Exams*, 1935; *The Construction and Use of Examinations*, ed. by H. Hawkes, 1936; Ministry of Education Circular 168, April 1948; Reports of the Secondary Schools Examinations Council.

Examinations (U.S.A.). The re-organisation of the secondary schools during the 19th cent. in America forced educators to revise their views on E. The Common school made it almost impossible to organise promotions from one grade to the next on the basis of examination success. In time the grades became age groups and graduation from High School a recognition that the course had been completed successfully without necessarily the pass-

ing of a severe leaving exam. This created problems for the colleges and univs. The older univs. retain their own entrance tests but many state institutions accept students who have graduated from accredited high schools. Consequently the univ. pop. has increased enormously. Since entrance tests are not rigorous there is a good deal of wastage throughout the course, and students frequently move from stronger to weaker institutions during the course of their studies. Selection is much more rigorous at the Ph.D. level. Here the E. are of the type usual in England. Essay type papers are set on course work; in addition a thesis is required. At the Bachelor and lower levels many of the E. are of the objective test type. These have been developed for a great variety of specific purposes. On the whole they are used to predict future success rather than to discover what a student has learned during a course. If carefully worked out they can form the basis of very accurate predictive instruments of professional competence and further academic success. The very large numbers of students that attend all types of educational institution have to some extent forced on to educators the use of these tests. They are quickly marked and the human element which necessarily enters into the marking of many essay type examination papers is entirely removed.

Examiner of Stage Plays, see CENSORSHIP OF THE DRAMA.

Exanthema (Gk 'eruption'), any disease characterised by a skin eruption. In practice the term is applied to those infectious fevers which are accompanied by a skin rash.

Exarch, (Gk *exarchos*) signifies chief person, or leader. In the Rom. empire the viceroy of the Byzantine emperor in Italy bore this title, and it has been conferred at different times on governors and chief officers, both in secular and eccles. matters. In the Christian Church E. was originally a title of the bishops, but afterwards came to be applied to a primate only. The spiritual head of the modern Bulgarian Church bears the title of E.

Excalibur, the mystic sword of the legendary King Arthur, which, according to the promise of Merlin, he received from the Lady of the Lake. At his death it was hurled into the lake by Sir Bedivere, where it was received by a hand which rose from the waters.

Excambion, in Scots law, the term applied to the exchange of heritable subjects.

Excavation, in engineering, is an open cutting in the ground. The machines used are called excavators. They are sometimes known as 'steam navvies,' and combine the properties of a digger and a crane. The kind that generally comes into operation first looks like an ordinary steam crane, save that it is mounted on wheels and rails. It is fitted with an iron scoop with a heavy handle to which a second chain is fastened. The machine that is used to widen the cutting made by

the above is stationed on a temporary line of rails a few ft from the edge of the cutting. The jib of the machine is lowered until the row of scoops cut into the earth; they then scrape up the side of the bank and passing over the excavator empty themselves into waggons beyond. The machine and the waggons are moved along together. Another class of excavator is the 'ladder excavator'; this comprises a ladder pivoted at the upper end which can be raised or dropped at the lower end to any required angle. The ladder is constructed of 2 channel irons braced together, a trolley running in the middle and forming the back of the bucket. The resistance of the excavated material is met directly by a chain which is attached to the bucket. A small independent engine controls the movements of the ladder. The operation of filling, emptying, and lowering a bucket of half a cub. yd capacity takes about 40 sec. The first type of excavator is capable of more varieties of work, but the second is more powerful. The most economic method of working is for double track roads for waggons to be cut on the flank, a central gullet having first been cut for the machine's own passage. These machines are a modification of the dredgers (q.v.) used for dock works, etc.; in America they are called 'dredgers,' as are the other variety, a practice which is confusing. 'Grabs' are sometimes called 'excavators,' but this use is deceptive as grabs can work both in water and on land, and the term 'excavator' is properly applied only to land machines. See W. Barnes, *Excavating Machinery*, 1928; K. Park, *Principles of Modern Excavation Equipment*, 1942.

Excellency, title of honour, once borne in Great Britain by the viceroy of India and the lord-lieutenant of Ireland, and now by the governors of colonies, and ambas.

Excentric, see EOCENTRIC.

Excess Profits Duty, a tax varying from 40 to 80 per cent imposed in 1915 on P. exceeding by £200 or more those made before 1914, the standard by which the E. P. were measured being the average of P. of any 2 of the 3 years preceding the war. Exemption was allowed to farmers and to persons engaged in certain professions and employments. Though successful in producing revenue, the tax was not economic, as it encouraged wasteful expenditure by the taxpaying firm or company. It was abolished in 1921. See PROFITS TAX; EXCESS PROFITS TAX; EXCESS PROFITS LEVY.

Excess Profits Levy was introduced in the 1952 budget as a temporary measure. It imposed a tax of 30 per cent on the amount by which P. made from 1 Jan. 1952 exceeded the standard P. of a trade or business or company (not partnerships or individuals). The L. was abolished from 31 Dec. 1953. The standard was based on the period 1946 to 1951; there were sev. alternatives and a minimum of £5000. The yield for the financial year 1954-5 was £77 million, and

for 1955-6 £18 million. See EXCESS PROFITS DUTY; EXCESS PROFITS TAX; PROFITS TAX.

Excess Profits Tax was charged by the Finance Act (No. 2) 1939 as a T. to deal with all P. arising out of the war, and operated from 1 April 1939 to 31 Dec. 1946. It applied to all trades and businesses carried on in the U.K., but not professions. The T. was charged upon the amount by which the P. exceeded the standard P. The rate was 60 per cent up to 1 April 1940, 100 per cent from then until 31 Dec. 1945, and 60 per cent thereafter. A refund of 20 per cent for the period where the T. was 100 per cent was made after the war. These refunds were subject to income T. and had to be used for developing or re-equipping the trade or business (Finance Act (No. 2) 1945). National Defence Contribution (later Profits Tax, q.v.) was chargeable instead of E. P. T. if it exceeded the latter in amount. The average yield for the financial years 1941-2 to 1945-6 was £394 million. The net refunds made for the financial years 1945-6 to 1954-5 were £276 million. See PROFITS TAX; EXCESS PROFITS DUTY; EXCESS PROFITS LEVY.

Exchange (Fr. *changer*; It. *cangiare*, *cambiare*, *cambire*, to barter or exchange), term applied to many transactions and to the circumstances connected with them, all of which have, however, the basal idea of the giving of one thing—material, labour, or rights—for another. The *Exchange of Lands*, in law, is a mutual or reciprocal grant of equal interests in land, the one in consideration of the other, as a grant of a fee simple in return for a fee simple. Facilities for E. by parties under disability or tenants for life are now provided under the Inclosure Acts and the Settled Land Acts. In eccles. procedure, the *Exchange of Livings* is conditioned by the consent of the bishops and patrons of both the benefices concerned. It is effected by resignation, and no monetary compensation for inequality in the value of the livings may be offered or accepted. *Exchange in Commerce* is used in various senses of the giving or receiving of money or of one currency in return for an equivalent sum in another currency (see EXCHANGE, FOREIGN); the giving or receiving of money in one place for a bill providing the payment of an equivalent sum in another place; the rate at which this documentary transfer of money may be made, etc. The *Exchange* is applied to the assemblage or merchants, bankers, and brokers for the transaction of business in commodities, stocks, bonds, bills, etc., and also to the place in which they meet for such purpose, e.g. the Royal E. in London, the Bourse in Paris, and the Stock E. in New York. A *Deed of Exchange* is a legal document recording the transfer of lands, etc., and is provided for by the Real Property Act of 1845.

Exchange, Bill of, see BILL.

Exchange, Foreign, term applied to the exchange of one currency for another in order to settle the indebtedness arising out of trade between countries. (F. currency

itself is often referred to as 'foreign exchange'.)

The basic theory of exchange is that only the balance of the transactions shall be liquidated, by a transfer of credit or gold. F. E. is at its simplest when 'at par,' i.e. when a sum of currency in one country is able to buy a bill for a sum of currency in another country, the 2 sums being equivalent to the same amount of bullion of a given standard. The discharge of international liabilities may be performed in 3 ways: (1) By remitting bullion or cash in coin. This method is little used owing to the cost of transport and insurance. (2) By remitting international securities, i.e. certain well-known gov. bonds and other securities or stocks and shares. This method is also expensive since brokerage charges have to be added to the cost, and the margin between the buying and selling price is also a loss. (3) By remitting bills of exchange. This is the cheapest and easiest method of F. E. and the most common. These bills need not be drawn upon the country to which they are remitted, e.g. it may be most profitable to effect a remittance from London to Paris by means of an Amsterdam bill drawn upon Paris. The principle upon which this business is transacted may be roughly illustrated thus: A, a merchant in London, has to make a remittance to Paris to a merchant B. B, in order to save A the risk and expense of transmitting cash, draws a bill for the amount due upon him. B sells this bill to C, another Paris merchant, who sends it in place of cash to settle his account with D in England. At the expiry of the time the bill has to run, D takes it to A, and receives cash in exchange for it, while the possession of the bill marks A's discharge from B's debt. The bills are commonly drawn at 3 months' date.

F.E. and the market price of bills of exchange are affected by 2 main causes, the relative indebtedness of the 2 countries involved, and the rate of discount ruling in each. If one country is considerably in debt to the other, the price of bills upon the creditor rises in the debtor's market owing to the competition of merchants who are trying to buy bills to remit, while in the creditor's market the absence of demand for bills upon the debtor tends to lower their price. The second factor is really the value or price of money in the 2 countries, since a high rate of interest in one country will tend to make foreign merchants buy bills upon it, and the increasing demand again leads to an increase in price.

The First World War played havoc with the ratio of F. E. The natural flow of trade and consequently of bills of exchange between the nations was severely impeded, and in the case of the enemy countries stopped altogether. The inflation of the currencies of Germany and Austria by means of the printing press explains why the currencies of these countries had for some time not even an external nominal value. When the new Reichsbank was formed in Germany, it

called in all its previous circulation and converted it into Reichsmarks at the rate of 1 trillion marks for 1 Reichsmark.

F. E. was also much disturbed in the decades following the First World War by the abnormal influence of huge indemnity and war debt payments and by attempts to secure transitory commercial advantages through deliberate currency depreciation. In Britain the machinery of the Exchange Equalisation Fund, which was estab. in 1932, contributed to the removal of difficulties caused by rapid fluctuations of E. But towards the end of 1938 the fund, having sustained heavy losses of gold in defence of the currency, had to be strengthened by increasing the Bank of England's fiduciary issue to a record issue, a sum of £200 million of gold, valued at the old parity price of 85s. per fine oz. (equivalent to £350 million at the then current price), being transferred to the Fund from the issue dept of the Bank.

On the outbreak of the Second World War in 1939, the gold reserve of the Bank of England was transferred to the Exchange Equalisation Fund (or Account) as part of the general plan for strengthening the country's financial resources abroad. U.K. residents holding U.S.A. dollar securities were required to register their holdings with the Bank of England, and thereafter the Brit. Gov. gradually acquired all Brit. holdings of U.S.A. railroad and industrial dollar securities at fixed sterling prices, the purpose being to conserve all the dollar exchange possible for financing war purchases in the U.S.A.

The Exchange Control Act, 1947, purported to put in legislative form the obligation which rested on Britain, as a result of the series of agreements with the U.S.A. associated with Bretton Woods (q.v.) and the Amer. loan to Britain of 1946, to free current exchange business from control while at the same time maintaining a necessary restraint upon movements of capital.

The pound was periodically weak, and in 1949, to stop a serious run on the reserves, it was devalued by 30 per cent in terms of dollars. Then improvements in exports strengthened the demand for sterling. In 1954 it was almost possible to abandon exchange controls over imports, overseas investments, etc., and make sterling freely convertible into other currencies. But in 1955-6 the position deteriorated again, the reserves shrank, and convertibility seemed as far off as ever. See STABILISATION; METROLOGY.

Exchange Rates, see METROLOGY.

Exchequer (Norman-Fr. *eschequier*). The name of the king's court of revenue is taken from the fact that in early times the accounts were reckoned upon a chequered cloth, resembling a large chess-board, round which the officers sat. The Eng. and Fr. words are allied to the Lat. root *scac*, which appears in *scaccum*, a chess-board, and *scaccarium*, the Court of E., and also the chequered cloth used there. It appears that the sums of money received by the treasurer were scored upon the squares of this cloth with

counters, the process being suggestive of a game of chess. The name only began to be used about the time of Henry I, and previous to the use of the chequered cloth as an aid to calculation business was transacted by means of 'tallies,' or notched sticks.

Exchequer, Chancellor of the, head of the Treasury Dept, being one of the most important members of the cabinet in the Brit. Gov. He must be a member of the House of Commons, and acts as the first finance minister of the crown, having the duties of preparing the ann. budget, i.e. the estimates of revenue and expenditure, imposing or removing taxes in order to meet deficit or surplus, and, in general, managing all matters relating to public money. He is also responsible for co-ordinating economic policy. The office of C. of E. may be held by the prime minister, if the latter is a member of the House of Commons, and the combined office has been held by Wm Pitt (1804-6), George Canning (1827), Sir Robert Peel (1834-5), and Wm Ewart Gladstone (1873-4 and 1880-2). The chancellor was originally an under-treasurer, who checked the proceedings of the lord high treasurer. He also had important judicial functions, sitting on the 'equity side' of the Court of Exchequer. These disappeared in the 18th cent., the last C. of the E. who sat as a judge being Sir Robert Walpole, who gave a decision in this capacity in 1735.

Exchequer Bills, see BILL OF EX-CHEQUER.

Exchequer Bonds, see PUBLIC DEBT.

Exchequer Court, former court dealing with common law and revenue cases. These functions are now performed respectively by the Queen's Bench and Chancery Divs. of the high C.

Exchequer (Ale) Gallon, see METROLOGY.

Excise Duties, imposed on home-produced commodities and services, usually of stable consumption, so that the estimated revenue can be relied upon. Sometimes levied on certain commodities as a countervailing tax to a customs duty on imported goods of the same nature. If an article is manuf. both at home and abroad, a customs duty tends to exclude the foreign article from the home market; an E. duty, by taxing the home product as well, makes it as large a source of revenue as possible. All licences come under the heading of E., excepting those for motor vehicles. E. D. were first imposed by the Long Parliament in 1643 to raise funds for the Civil war against Charles I, and were levied on wine, beer, tobacco, and other articles. But the term is Dutch, and the procedure medieval. A similar parl. project had failed in 1626. The leading events in the hist. of E. D. are: (1) Walpole's abortive E. Bill of 1733 to check frauds in the customs revenue from tobacco and to found a bonded warehouse system—a plan successfully revived during the ministry of Wm Pitt the Younger; (2) the Parnell Commission of E. Enquiry in 1833-9; (3) the amalgamation in 1909 of customs and E.; and (4) the

advent of entertainments tax in 1916. The 4 pillars of Brit. E. policy are alcoholic liquors, tobacco, motoring, and entertainment. Tea, coffee, matches, and playing cards are also significant. Specific D., despite their regressive tendency, are usually preferred to *ad valorem* D. since more easily predictable, and mass-consumption goods are favoured because they are less sensitive than others to rises in price. See also CUSTOMS DUTIES. See F. W. Hirst, *Gladstone as Financier and Economist*, 1931; G. F. Shirras and L. Rostas, *The Burden of British Taxation*, 1942; and Ann. Reports of Commissioners of H.M. Customs and Excise.

Excise (Wine) Gallon, see METROLOGY.

Excitants, see STIMULANTS.

Exclosure, see ENCLAVE.

Exclusion Bill (1679-80), measure brought forward by Shaftesbury to prevent the duke of York (afterwards James II) from coming to the throne, owing to his adherence to the Rom. Catholic faith. It was 3 times passed by the Commons, but on each occasion Charles II dissolved parliament.

Excommunication (Lat. *ex*, out of, from; *communio*, communion), exclusion by formal sentence of offenders from the rights and privileges of the religious community to which they belong. The hist. of the practice of E. may be traced through pagan analogies, Heb. customs, primitive Christian practice, medieval and monastic usage, and modern survivals in existing Christian Churches. That the Christian Church has always laid claim to the powers of E. is shown by such early writers as Irenaeus, Cyprian, Basil, Ambrose, etc., who give proof of the existence of 2 degrees of E.; the first involving exclusion from the participation in eucharistic service, and the second involving 'exclusion from all church privileges.' The former was the usual punishment for light offences, the latter the penalty for graver scandals. The necessity for Church discipline did not cease to be recognised at the Reformation; though its administration would seem to have passed through a period of some confusion. In some cases, the old episcopal power passed into the hands of the civil magistrate, in others it was conceded to the presbyterial courts. In the Anglican Church the right of excommunication is in the hands of the bishops, though it is never exercised. In contemporary Eng. Free Churches the purity of the Church is commonly secured by the removal of persons unsuitable for membership by a vote of the responsible authority. In the Rom. Church E. is either *ferendae sententiae*, when the intervention of judicial process is required to attach it to a given person; or *latae sententiae*, when a crime carries E. with it automatically. An excommunicated person may be *tolerandus*, who is cut off from the spiritual benefits of the Church only; or *non tolerandus*, with whom the faithful may not associate in any way at all. E. in certain cases is reserved in varying degrees of strictness to the Holy See. See the *Codex Juris Canonici*.

Excretions, eliminatory products of such organs as the skin (q.v.), kidneys (q.v.), intestines (q.v.), etc., viz. sweat, urine, faeces, etc. See also RESPIRATION.

Exe, riv. of England, which rises in Exmoor. It flows through the coo. of Somerset and Devon in a southerly direction, its chief tribs. being the Barle, Loman, Batham, Culm, and Creedy. Its course of 54 m. is through beautifully wooded and picturesque country. The tns on its course are Dulverton, Tiverton, Exeter, Exmouth, etc. Its estuary is navigable for 8 m., but although it is a m. in width, the estuary does not take large vessels because of the shallow waters. A canal connects it with Exeter.

Execution, enforcement of judgments and other proceedings analogous to judgments of courts of law in civil actions. The term denotes the process by which a party is put into possession of that to which the judgment declares him to be entitled. It is generally effected by a writ directed to the sheriff or other proper officer, commanding him to seize goods or take other compulsory proceedings to carry out the judgment. In the simplest form of judgment the defendant is ordered to pay the judgment creditor *forthwith*, and the latter may at once proceed to E. Under a writ of *fi. fa.*, which is the most ordinary form of E., the sheriff is directed to 'cause to be made' (*feri facias*) out of the goods and chattels of the debtor the sum recovered by the judgment, together with interest at 4 per cent, and to bring the sum into court for payment to the judgment creditor. Armed with this writ the sheriff may enter the premises of the debtor and seize what property of the debtor he can find, with the exception of wearing apparel and bedding, and tools and implements of trade to the maximum value of £5. He may then sell the goods seized, including leases of land, but not freehold estates of inheritance, for these latter go to the heir of the debtor. Where goods seized are claimed by a 3rd person the sheriff must take out an interpleader summons upon which an issue to try the title to the goods will be directed. (For the application of a writ of *elegit* to enforce E. against the debtor's lands, see ELEGIT.) In many cases the ordinary processes of the common law will not avail to enforce a judgment, e.g. against a share of the proceeds of land to be, but not yet, sold, or against rents. In such cases the court may at its discretion appoint a receiver by way of what is called equitable E. Another mode of equitable E. is to obtain a charging order against a partnership interest; E. against debts owing to the judgment debtor is enforced by process of attachment of the debts (see GARNISHEE). Other writs of E. are of *attachment* (q.v.), of *possession*, to put the plaintiff into possession of land recovered in an action, and of *delivery*, to enable the plaintiff to get possession of property other than land or money. E. is also used to denote the giving effect to the sentence of a court of criminal jurisdiction, and in this sense usually means the E. of sentence of death.

(see CAPITAL PUNISHMENT). For the meaning of E. in relation to deeds and wills, see DEED; WILL.

Executive. In every sovereign political society, or state, there must exist some person, group of persons, or body independent of all external control, with power to maintain the independence of the state against aggression from without and to preserve order within. Such person or body is known as the E. Non-sovereign political societies may also possess an E., but in all such cases, as e.g. in the case of colonies and protectorates, that E. acts under the active or latent control of the E. of some other state or suzerain power. E. powers are to be distinguished from legislative, although both may be vested in one person or group of persons. The function of a legislature is to make laws, but the functions of the E. are (1) to give those laws legal effect, and to enforce them where necessary, and (2) to determine the policy of the state in its foreign relations. In the case of an absolute and despotic monarchy all the executive powers reside in one person, who may or may not be assisted by a council of chosen advisers. In a limited constitutional monarchy, the E. power resides collectively in the crown and its responsible ministers or cabinet (see CABINET and CROWN). In federal states the E. powers reside in some central body composed of representatives of the various federated bodies. In the Brit. Crown Colonies a nominated governor or governor and council wield the E. powers (see COLONIAL LAW; CROWN COLONIES).

It is to be observed that the interdependence of the legislature and E. of those representative govts. of the present day which possess what may be termed a 'parliamentary executive' is such that the E., far from being distinct from the legislature, is, in reality, chosen from among the members of the latter, and not only appointed but dismissed by the elective portion of the legislature. In the case of those representative govts. where the E. power is in an emperor and his ministers, or a president and his cabinet, the E. is appointed by the legislature, and is therefore a 'non-parliamentary E.' Under the constitutions of Britain, Belgium, Italy, and the Fr. Rep. there exist parl. E.s, while examples of non-parl. E.s are to be found in the U.S.A. and the pre-1939 Ger. empire. For an exposition of the various prerogatives of the E. in England, see CROWN; and for the relationship between the E. and parliament, see CABINET. See also CONSTITUTION.

Executor. The person or persons to whom another person commits by his last will the carrying out of his testamentary wishes is or are his E. or E.s. An E. can only be appointed by will or by codicil; but he need not be termed an E. in the will if it can be inferred from the powers and duties vested in him by the testator that he is to be E. It is usual to appoint 2 E.s, although 1 is sufficient; any number up to and including 4 may be appointed. An E. may be a legatee: thus

a child or wife to whom the whole or a portion of the estate is left may be appointed sole E., or 1 of 2 E.s. If an E. has not been appointed in the will, or if the E. be dead, or does not wish to act, the residuary legatee nearest of kin to the deceased, or a legatee, is entitled to act and administer the will. A person appointed E. may accept or refuse office, but he will be taken to have accepted if he performs acts of authority over the estate or property from which it may reasonably be implied that he means to accept, and similarly his refusal may be implied from his abstaining from intermeddling in the administration. The authority of an E. dates from the moment of the testator's death. The will is the only source of his title to act, but probate of the will is the only evidence of that title. Before probate an E. may validly perform any of his executorial functions, such as receiving debts or paying legacies, but he can maintain no action at law until he takes out probate. Where there are sev. E.s they are not bound to act jointly, and most executorial acts are valid even if done by 1 E. separately. The duties of an E. are to bury the deceased in a fitting manner, but without incurring unreasonable expense; then he should prove the will and take out administration. The other duties are, within a convenient time after the testator's death, to collect the goods comprised in the estate, make an inventory of the personalty, advertise for creditors and debtors, and deal with the personal effects as directed by the will. He has a year in which to pay or transfer the legacies; but if the solvency of the estate is beyond question, he should pay or transfer them before the end of the year, and may be sued if he does not do so. At the end of his year he must submit an account of his dealings to the proper authorities. These dealings will, in general, be the payment of debts and legacies in the order laid down by the rules of equity.

Since the Land Transfer Act, 1897, real property also vests, in the first instance, in the E.s or other personal representatives of the deceased, whether the deceased *d.* intestate or not; and an E. may sell the real estate if necessary for the purpose of paying debts, but where not required for debts the E. must transfer the real estate to the devisee, or, if not devised, to the next of kin. An E. should be careful not to mix the moneys belonging to the estate with his own, as he may be charged interest on it. Interest is charged on all moneys received by an E. and not properly applied, or which have been allowed by him to lie idle. If a stranger, i.e. one not constituted E. by the will, assumes the functions of an E. by intermeddling in the administration, he is called in law an *E. de son tort*, i.e. an E. of his own wrong. Such acts of intermeddling do not include the burial of the deceased, or the preservation of the goods, or payment of funeral expenses, or other acts which may appropriately be termed acts of salvage or charity. An *E. de son*

tort is liable for such assets as come into his hands, and may be sued as if he were the rightful E. There is no remuneration allowed to an E. save as expressly provided by the will; but in Canada the E. is allowed 5 per cent commission on the money passing through his hands.

Executory. In the Eng. law of real property an E. interest is a future estate or title to land, which is said to arise of its own strength when the contingency on which it rests is fulfilled, and to put an end to prior estates or interest; e.g. in an ordinary marriage settlement of land, the settlor, a day or two before the marriage, conveys land to trustees to hold for him until the marriage takes place, and after that to such other uses or trusts as may have been agreed upon between the spouses or their parents. In the law of contract, an E. consideration (q.v.) means a future as opposed to a present consideration or a promise as opposed to an act.

Exedra, in architecture, an open recess, such as a niche containing a seat, and usually curved in plan.

Exegesis, exposition, explanation, or interpretation of the Holy Scriptures. Hermeneutics is the term frequently used for the discovery of the meaning of the Bible, but E. is distinguished from it as covering the exposition and application of Holy Scripture to faith and conduct.

In a general sense, however, the term is now applied to the science and art of the elucidation of Scripture. E. includes both the study of the text and its doctrinal bearing, with the conclusions to be drawn from it. E. requires a wide and accurate learning as well as intellectual and spiritual intuition.

The 2 main currents of E. are the literal and allegorical. The tendency to seek an underlying sense in writings of venerable age regarded as authentic and weighty, if not inspired, gave rise to the allegorical method, which, as it gives full scope for the penetration of original minds, is much more popular than the literal method. The 19th-cent. exegetes were the first to establish a satisfactory critical attitude by insisting on the human as well as the divine element in the Scriptures. The Jewish E. of the O.T. is seen in the Talmud (q.v.). Hellenist Jews used allegorical interpretation to reconcile the Heb. traditions and Gk philosophical thought. Philo was the greatest master of this art, and he discovered a twofold teaching in the Pentateuch—the verbal and the figurative. The Alexandrian school adopted this system, and its influences show themselves, though to a lesser extent, in the writings of Hippolytus and Augustine. As opposed to these, the Antiochene school, represented by Theodorus, Lucian, Diodorus, and Chrysostom, aimed at a grammatical and historical criticism, which at times, however, degenerated into an unspiritual and bare interpretation. Exegetical work was practically at a standstill during the Middle Ages; but Nicolas de Lyra (1270–1346) made a transition to the modern

period in his *Postillae*, emphasising the literal sense; and the humanists, headed by Erasmus, began serious and systematic philological investigations. Modern exegetes are too numerous to mention. See E. Hatch, *Hibbert Lectures*, 1888; and A. Cave, *Introduction to Theology*, 1896. For fullest and latest information, see also *The Cambridge Bible for Schools and Colleges*; the *International Critical Commentary*; and *A Catholic Commentary on Holy Scriptures*, 1953.

Exelmans, Remy Joseph Isidore, Comte (1775–1852), marshal of France, who fought under Murat in the Sp. campaign, during which he was taken prisoner and sent to England. He escaped in 1811 and joined Napoleon's army in Russia in 1812, being made a gen. of div. for his bravery. He was exiled from France at the fall of Napoleon, but was allowed to return in 1823.

Exemplum, or **Exemplar** (Lat. 'example'), in medieval religious literature, signifies a short tale used for a didactic purpose, an illustrative story akin to a fable (q.v.).

Exequatur, in international law, the document issued by the state to which a consul is accredited, confirming his appointment. This appointment has, of course, previously been made by commission or patent issued by the consul's own state. The foreign state is at liberty to decline an E., or to withdraw it when issued.

Exeter: 1. City, a co. of itself, administrative cap. of Devon, England, at the head of the estuary of the R. Exe, 9 m. from the S. coast of Devon, and 172 m. from London, an episcopal see, and the seat of E. Univ. (q.v.). As a mercantile and residential centre, holiday resort, and minor port at the conjunction of many roads and of the W. and S. Regions of Brit. Railways, it retains much of its ancient dignity as the metropolis of the SW. peninsula, formerly the Brit. kingdom of Dumnonia. Its origin has not been estab. Inconclusive evidence suggested that a tn may have existed here in the 3rd cent. bc. That 'Isca of the Dumnonii' was well estab. by AD 55 has been proved by excavation. Sixty years later it was known to Ptolemy the geographer in distant Alexandria and continuous habitation from his day to ours is a dominant feature of the city's story. St Boniface, the apostle of Germany and a native of Crediton, received his early education in an Exeter monastery about AD 690, by which time the Saxon incursions had extended to this dist. For 2 centuries the Britons and Saxons shared the city, jointly defending it against the Danes in 877 and 894. In 928 Athelstan met the Witan here and expelled the remaining Britons. In 1003 the place was sacked by Sweyn. At the Norman Conquest, E. was already an ancient city with prescriptive privileges, among which Domesday notices an exemption from geld save when London, Winchester, and York, the other regional caps. of the country, might be taxed. The tn of those days,

enclosed by a wall of mixed Rom., Saxon, and medieval workmanship (now attenuated, but still continuous save where the 4 main gates have been demolished within the last 150 years), covered a polygonal area of one half by one third m., upon a 170-ft hill E. of the riv. In 1067, with Harold's kin as its guests, E. defied the Conqueror, but submitted after a siege of 18 days. Within the highest N.E. angle of the tn wall, Wm then raised the strong motte-and-bailey castle of Rougemont, so named from its red masonry and earth, noticed by Shakespeare in *Richard III*, act iv., scene ii. The earliest allusions to municipal gov. here recall Rom.



THE GUILDHALL, EXETER

and Saxon administration: it is not until about 1200 that a mayor is noticed. The extant city charters commence with a confirmation by Henry II of customary rights enjoyed under his grandfather, Henry I, together with the privileges of the Londoners. Other grants were received from 22 sovereigns or princes between Richard I and George III. Henry VII, in token of his gratitude for firm resistance to Perkin Warbeck, gave the State Sword and Cap of Maintenance which are still borne before the mayor. Henry VIII, in 1537, made E. a co. incorporate, independent of Devonshire, with liberty to elect its own sheriff. In 1549 it withstood the Prayer-Book Rebels. In 1643 it was occupied by Prince Maurice for King Charles. In 1646 it surrendered to Fairfax. Wm III spent 11 days here after his landing at Brixham in 1688.

The Guildhall, home of the anct City Court, is documented from 1160 and believed to be the oldest municipal building in the country. Rebuilt in 1330 and 1468-70, the date of the fine timber roof, it has a famous Elizabethan portico with an upper chamber athwart the pavement and contains much good woodwork, portraits, including two by Lely (q.v.) of Princess Henrietta ('Madame'), b. here in 1644, and of George Monk, duke of Albemarle, whose maternal grandfather was thrice mayor; the city regalia and silver ware. At a little distance the handsome 15th-cent. Hall of the Tuckers commemorates E.'s woollen trade and her many corporate guilds. The cathedral church of St Peter, around whose foundations exist remains of the Rom. baths and Saxon conventual buildings, springs from a monastic church estab. by Athelstan in 932 and rebuilt by Canute in 1017. The see was removed hither from Crediton in 1050, when Edward the Confessor and his queen personally enthroned Leofric as 1st bishop of Exeter. As now seen, the noble structure is most remarkable for its massive transeptal towers of 1112-33, which leave unbroken the lofty vault over nave, choir, and sanctuary, 100 yds long from E. to W.; for its unique 14th-cent. organ-screen, fine minstrels' gallery, episcopal throne, tombs of the medieval bishops, and sculptured W. screen. In 1942 a Ger. bomb destroyed the Chapel of St James in the S. choir aisle, besides doing other grave damage to the cathedral and adjacent palace. The Benedictine Priory of St Nicholas, in the Mint, contains good 13th-cent. work.

Intensive bombing on 4 May 1942 destroyed 9 and damaged 22 churches; destroyed 1800 and damaged 17,000 other buildings. Three devastated areas deface the city centre, with other damage dispersed over a wide area. The Probate Registry perished with all its contents, as did Bampfylde House, Norman House, Chevalier House and the medieval Hall of the Vicars Choral. The City Library was gutted by fire. Much damage was done to Southernhay, Queen's Crescent, and York Road, and also to St Sidwell's Church, most of the banks, St Luke's College, and the Heavitree Hill Hospital. Nevertheless, E. retains a remarkable wealth and variety of good buildings belonging to all periods from the Middle Ages to the Regency. Her most famous accumulations of historical manuscripts also survived: the *Exeter Book* of A.-S. poetry, *Exeter Domesday Book*, the episcopal and chapter archives in the cathedral library, the copious city archives, with other collections belonging to the city library, and the co. records in the castle. In the bombed area adjoining South Street, in ground that probably comprised one of the central *insulae* of the Rom. city of Isca, excavations in 1946 uncovered 2 interesting wooden houses of the 1st Rom. occupation. Finds of Samian and coarse pottery of pre-Flavian character enable the period of occupation to be fixed at about AD 55-75. Beneath the

remains of St. George's Church the walls and flooring of a colonnaded stone building were found of the same period extending up to and below South Street. The discoveries give a good indication of the alignment of the Rom. city. Fragments of walls found seem to establish that the one-time Saxon church was a building some 35-40 ft long and about 15 ft broad. It is of interest as the sole example of the period known technically as Devon.

St Luke's College, founded in 1838 as a Church of England Training College, the oldest foundation of its kind in the country, was partially destroyed in 1942. It was reopened in 1945 and prepares about 200 students, chiefly for the Ministry of Education Certificate. The Royal Albert Memorial Museum and Art Gallery in Queen Street contains good collections illustrating zoology and local archaeology.

The port of E. extends down-river to the sea, and coastwise eastward to the Axe and westward to the Teign. In the 5½-m. canal stretching from the tn quays to Topsham, E. has the earliest lock canal in the country, though much deepened and widened since its construction in Elizabethan days. The prin. industries are paper-making, brewing, flour-milling, tanning, iron and brass founding, and light engineering. The parl. bor. of 4705 ac. returns 1 member. Pop. 76,600.

2. Tn of New Hampshire, U.S.A., cap. of Rockingham co., 10 m. from Portsmouth, at which many eminent men were educ.; there are some fine colonial homes. It was at E. that the first independent state gov. was formed. It contains the Phillips E. Academy (opened 1783). Pop. 5860.

Exeter, Peerage of. The titles earl, marquess, and duke of E. have been borne by members of the families of Holland (Holland), Beaufort, Courtenay, and Cecil. The 1st duke of E. was John Holland, son of Thomas (d. 1380). He was created duke by Richard II in 1397, and as the king's half-brother held a high position at court, but after plotting against Henry IV he was beheaded in 1400. The 2nd duke, Thomas Beaufort, was created in 1416. He was the youngest son of John of Gaunt by Katharine Swynford. The title expired on his death (c. 1426). In 1443 John Holland, son of the 1st duke, was created duke of E. under Henry VI. His son, Henry, supported Henry VI in the Wars of the Roses, and was attainted (1461). In 1525 the earl of Devon, Henry Courtenay, was created marquess of E., the title becoming extinct on his execution (c. 1538). The earldom of E. was bestowed on Thomas Cecil, 2nd Lord Burghley, 1605, son of William (d. 1598), by James I. His direct descendants carried on the title, Henry, the 10th earl, becoming marquess of E. in 1801. The present marquess is a lineal descendant.

Exeter, University of, incorporated as the U. College of the S. W. in 1922, and created the univ. of E. by royal char-

ter in 1955. It provides courses for degrees in the faculties of arts, sciences, social studies, and law. There are about 1000 students, 550 of whom are accommodated in halls of residence.

Exeter Book, or Codex Exoniensis, a unique MS., probably of the first half of the 11th cent., which was presented to E. Cathedral, where it is still preserved, by Leofric, bishop of E. from 1050 to 1071. In addition to some legal documents it contains an anthology of O.E. poetry. It includes among other pieces *Widsith*, *Deor*, *The Wanderer*, *The Seafarer*, *The Rhyming Poem*, *The Whale*, *The Ruin*, a number of religious poems, and some 80 riddles. It is one of the most important sources for O.E. poetry. See ed., with trans., by I. Gollancz, 1895.

Exeter College, Oxford, founded in 1314 by Walter de Stapeldon, bishop of E. Twelve scholars studying philosophy were supported at Oxford by the income of the rectory of Gwinear, Cornwall, which he had conveyed for this purpose to the dean and chapter of Exeter. Stapeldon housed them in Hart Hall and Arthur Hall, in the par. of St Peter in the East, but in 1315 removed them to buildings on the present site, known as Stapeldon Hall. In 1404 Edmund Stafford, bishop of E., added 2 fellowships and gave the college its present name. One of its more famous members was the earl of Shaftesbury.

Exeter, or Exon, Domesday, part of the great survey of England ordered by William the Conqueror. It is preserved at Exeter, and contains the original returns made by the 12 local jurors sent from each hundred in the cos. of Wilts, Dorset, Somerset, Devon, and Cornwall. It includes the details, omitted from the great *Domesday Book*, of the tally of live stock.

Exeter Hall, large building which formerly stood on the N. side of the Strand, London, originally built in 1831 as a proprietary estab. for the meetings of religious and charitable societies. It was purchased by the Young Men's Christian Association in 1880, and demolished in 1907, the site being occupied by the Strand Palace Hotel.

Exhibit, in law, a document shown to a witness while giving evidence and sworn to by him, or shown to a deponent while being sworn previous to making an affidavit in which it is referred to.

Exhibition. This term has come to be applied to the display of goods to the public for promoting trade, and denotes in a general sense a public show, but E.s are nowadays largely used by wholesalers as a convenient means of reaching the retail buyers and sellers of their goods. The first E. of any national importance was that credited to the marquis d'Avèze at Paris in 1798, consisting of a collective display of the art factories of France, including those of Sévres and the Gobelins. E.s continued to be held at Paris at varying intervals until the 11th, in 1849, of greater brilliance and extent than any preceding. The first E. of this

kind held in England was the unsuccessful National Repository near Charing Cross in 1838. Others followed at Manchester in 1837, Leeds in 1839, and Birmingham in 1849. The Great E. of 1851 (held in London) was a landmark in the development of such shows. A second great international E. was held in London in 1862, and though the numbers attending were over 6 millions, its success was marred by the recent death of the prince consort. Vienna held an international E. in 1863, which was surpassed by the Paris E. of 1878, for which the Trocadero Palace was erected, attended by 16 million persons. Even more magnificent was the Universal E. of 1889 at Paris, for which the Eiffel Tower (q.v.) was built, attended by 32 million persons. Es continued to be held at various capitals every few years, among the more notable being the Franco-Brit. at London, 1908, the Japanese-Brit., London, 1910, and that at Brussels, 1910, the last seriously marred by fire.

Es have been a great feature of the commercial hist. of the U.S.A. In 1876 there was held at Philadelphia the Centennial E. to celebrate the 100th anniversary of Amer. Independence, attended by nearly 10 million. The most remarkable feature was the display of U.S.A. machinery. A World's Industrial Fair, less successful than the Centennial E., was held at New Orleans in 1884-5. To celebrate the 400th anniversary of the discovery of America an E. was organised at Chicago in 1893. In 1933 Chicago opened a great World's Fair to celebrate a centenary of progress (attendance 22 million), followed by another in 1934 (attendance 16 million). The World's Fair at New York in 1939-40, which covered 1216 ac., attracted 34 million. The greatest E. ever undertaken in Great Britain was the Brit. Empire E. held at Wembley in 1924-5. It covered an area of 216 ac., and the various buildings housed treasures worth many millions of pounds. Great pavilions represented the dominions and colonies as well as the home gov. There were a model coal mine, cigarette factory, printing works, and other displays, while the amusement park and tattoo were immensely popular; in the first 6 months the Queen's doll's house (designed by Sir E. Lutyens and now at Windsor Castle) gained £20,000 for charity. In 1929 Spain organised 2 Es, one at Barcelona and the other at Seville, the former notable for the most beautiful electrically illuminated fountains ever seen. The Brit. Empire E. held in Buenos Aires in 1931 showed a very modern tendency in its display of films. In 1931 the Fr. held a very beautiful colonial Exposition at Paris to show the progress of the Fr. colonial empire, and among the many notable buildings was a reproduction of the famous temple of Angkor. The most recent Brit. Empire E. was that held at Glasgow in 1938 (attendance 12½ million), and contrary to usual experience it involved no financial

loss. In 1951, the centenary year of the Great E. of 1851, the Festival of Britain was opened at South Bank, London. The economic circumstances of the time precluded the original intention of an E. on a scale not previously attempted, and the result was an E. of the Brit. way of life and achievements since 1851. It was linked with other Es throughout the U.K. The attendance was 8 million, with the same figures for the Festival Pleasure Gardens at Battersea, but costs were £11 million as against receipts of only £2½ million. A permanent feature of the Festival was the Royal Festival Hall.

Nearly the whole year round in London there are Es of a specialised nature, e.g. there are rose, chrysanthemum, and other shows at the Horticultural Hall; cattle, horse, and dog shows at the Agricultural Hall—where may also be seen the ann. Drapers' E.—in addition to bakery, confectionery, brewery, and other trade Es. Olympia (q.v.) is the setting for many trade Es, and at Earl's Court there are held the Brit. Industries Fair (q.v.), the royal tournament, the radio, motor, and Smithfield cattle shows. Before the Second World War book Es were held in London, and after the war they were resumed. In general these are more in the nature of national trade fairs, the modern equivalents of the fairs that go back a long way in hist. See FAIR.

Owing to the work and expense of international Es many countries do not take part in some of them. As a result a Convention Relative to International Es was signed at Berlin in 1912, but with the intervention of the First World War it was never ratified, and a further convention, including most European countries, was signed at Paris in 1928. The convention set up an international Es bureau which deals with the recognition, patronage, and authorisation of these Es. It divides them into 2 groups, special and general, the 1st including the products of one kind and the 2nd the products of many kinds.

The term E. is also used for a bounty or endowment for a period of years given to a student in a school, college, or univ.

Exhumation. Under the Eng. law it is a misdemeanour as well as sacrilege to disinter or interfere with a human body in any way, without lawful authority for so doing, when the corpse is buried in consecrated ground. The eccles. courts have power to grant faculties for removing interred remains, but only that they may be re-interred in other consecrated ground. In cases of suspected foul play, the coroner may order disinterment for medical inspection, and E. may also be ordered by the Home Office, but otherwise no body may be disinterred without licence.

Exile, banishment from one's country by authority, either permanently or for a limited period. Outlawry and transportation involved E. Magna Carta abolished outlawry of freemen otherwise than by the law of the land. Transportation of

convicts was finally abolished in 1864. See also BANTISEMENT.

Existentialism, post-war philosophy which became the vogue in France after the liberation (1944), especially among intellectuals of the Lat. Quarter. The chief apostle of E. is Jean-Paul Sartre (b. 1905), who gave the world his creed in a series of successful plays, books, and essays. Briefly, E. may be defined as a school of thought based on a conception of the absolute inanity of existence, absurdity of the universe, negation of all creation and, therefore, of all morale; or, as Sartre has put it, 'all human activities are equivalent, all are destined by principle, to defeat.' One of the basic principles of E. is that man can shape his own destiny by the exercise of his will in the face of the given set of potentialities which is his life. The main premise and point of departure is the concrete fact that man *exists*. Predetermination is denied. Man has freedom of choice and action; and each man's actions, while subjectively inspired, influence other people, so every individual is responsible to humanity as a whole. No dogmatic solutions of the eternal questions of ultimate origins or endings are offered. A man can choose his faith. An existentialist, says Sartre, can be Christian or atheist. Sartre is an atheist, though his disciples included even Catholics until the condemnation of E. by Rome, 1948. Sartre supports his philosophy with the theory of complete atheism and the blind following of one's instincts and primitive impulses, in contradiction to that of Man Alone on Earth with God as his Judge. E. refutes the sublime in man and chooses to portray only his misery. Hence Sartre's play *Morts sans Sepulture* which tells of the extreme mental and physical suffering of a group of Frenchmen in the resistance movement who have been captured by Fr. traitors and thugs employed by the Ger. police during the occupation. His *Huit Clos* is a quasi-philosophical drama of frustration staged in an existentialist conception of hell, which was produced in London as *Vicious Circle* and in New York as *No Exit* with considerable success. Sustained criticism of E. has come both from Communists, who consider it incompatible with Marxist dialectical materialism, and from Catholics.

The familiar contrast between 'existence' and 'essence' suggests that the existentialist philosophy is not entirely novel; for, in the hist. of philosophy, it is implicit that we cannot derive the particular existent from its supposititious abstract properties or from those of which it is said to be an 'instance.' The existentialists of to-day are insistent that we must disregard the abstractions, generalisations, and inquiries into 'essential' qualities, and concentrate on existence in and for itself. To the existentialists, it is the particular experiences in which we make choices that are significant; for it is *choosing* rather than *thinking* that is explanatory of the existentialist attitude, because it is just those experiences which

enable us to feel and exhibit our individual distinctiveness. These experiences are, therefore, revelatory of our true nature: they are moments when we truly *exist*; they are experiences of *Existenz* (Kierkegaard). E. is, therefore, a philosophy which claims it is concerned with actual life as it is lived, and not with abstractions, and that it is specially concerned with the implications of those moments when life is lived in some revealing way, which is somehow different from mere living. But the difficulty in this logical analysis comes when the existentialist selects as revealing experiences such as are in no way universal, and upon them founds repellent systems as if they were revelatory of the predicament of 'mankind' in general. This was essentially the attitude of Kierkegaard, from whom, really, the existentialist movement borrows its distinctive features. Karl Jaspers, whose thought more resembles that of Kierkegaard than does that of the other existentialists, discusses in his *Philosophie*, 1938, the study of *Existenz* as a mode of philosophy, and in his work too we come again upon the contrast between mere existence and significant existing; but Jaspers introduces other persons and the interplay of mutual communication and stresses the experience of *another* person as a separate other person, whereas Martin Heidegger, whom Sartre follows, eschews an Other and argues, with consistent existentialist logic, that there is nothing there and that existence is somehow born from Nothing. See J.-P. Sartre, *L'Être et le néant*, 1943, and *Existentialism and Humanism*, 1948; G. de Ruggiero, *Existentialism*, 1946; E. Mounier, *Introduction to Existentialist Philosophies*, 1948; N. Bobbo, *The Philosophy of Decadentism: A Study of Existentialism*, 1948; R. Friedmann, *Kierkegaard and other Existential Studies*, 1949.

Exmoor, dist. on the border of Somerset and Devon, England, near the Bristol Channel, mainly moorland and marsh, the hills rising to 1100-1700 ft. The chief heights are Dunkery Beacon and Exe Head. Sheep and ponies are largely raised, and the E. breed is famous, while the red deer is still found, carefully preserved, and hunted. The R. Exe rises among the uplands. There are many prehistoric barrows. E. is the scene of Blackmore's romance of *Lorna Doone*.

Exmouth, Sir Edward Pellew, 1st Viscount (1757-1833), adm., entered the navy at the age of 13, and very early in his career proved himself capable and gallant. He rose rapidly in the service and in 1816 he won world-wide recognition by his bombardment of Algiers when the Bey refused to abolish Christian slavery. For this service he was made viscount. There is a biography by Edward Osler, 1835.

Exmouth, seaport of Devon, England, at mouth of R. Exe, on the Eng. Channel, 9 m. S.E. of Exeter. It is a noted watering-place, having beautiful surroundings and a sheltered climate. There are good docks, which are 530 ft long and were opened in 1869. E. is worth visiting

for its matchless sunsets. A 15th-cent. mill-wheel called Marpool Mill is still in motion. There is a wealth of pleasure grounds and shaded walks and a spacious esplanade 2 m. long. Pop. 18,000.

Exocoetus, see FLYING-FISH.

Exodus, The Book of, the 2nd book of the Pentateuch (q.v.) (see also GENESIS). It continues the hist. of the Israelites after the death of Joseph, with the birth and training of Moses, the exodus from Egypt, and the sojourn in the wilderness. The book ends with the account of the construction of the tabernacle and its fittings. See J. Jack, *The Date of the Exodus*, 1926;



VISCOUNT EXMOUTH

D. Davidson, *The Exodus of Israel*, 1933; H. H. Rowley, *Israel's sojourn in Egypt*, 1938; P. Adams, 'The Mount of God' in *Palestine Exploration Fund Quarterly*, 1930.

Exogamy, term applied to custom compelling marriage outside the tribe or clan, and the converse of endogamy (q.v.). It thus leads to the creation of ties of kinship between groups, and also prevents close in-breeding. It is found in every part of the world. The term was coined by J. McLennan in his *Primitive Marriage*, 1865.

Exogens, almost obsolete term for plants thickening in the stem by the activity of a cambium ring, such as the coniferae and dicotyledons (qq.v.).

Exon Domesday, see EXETER DOMESDAY.

Exophthalmic Goitre, see GOITRE.

Exorcism (from a Gk word meaning 'to conjure out'), the act of conjuring evil spirits to depart out of the person possessed, the term being specially applied to the freeing of an individual from a possessing spirit. There are numerous

examples of the exercise of E. in the N.T. and in the early Church, Tertullian and Origen speaking of it as an ordinary occurrence. The professional exorcist was known among the Jews, and the art was practised by women in Greece. The anc. rite of E. in connection with baptism is still retained in the Rom. ritual, which contains also a special rite for the E. of possessed persons. See G. Mylius, *De Abrogatione Exorcismi in Baptismo*, 1591; R. Woolley, *Exorcism and the Healing of the Sick*, 1932.

Exoterie, see ESOTERIC.

Exotic Plants are those introduced from a foreign country, as opposed to indigenous or native ones.

Expansion: 1. An E. or increase of bulk due to the action of forces from within is a notable effect produced by heat on matter. It has been found by experiment that most bodies expand when they are heated. The length of a metallic bar varies with change of temp., and is always the same at the same temp. This mere increase of length is more correctly called 'elongation' or 'dilatation.' The tire of a cart-wheel is thus fixed by enlarging the iron hoop by heat. As it cools it contracts, and clings closely to the wooden framework. In structures such as bridges and arches E. and contraction likely to ensue from changes of temp. must be taken into account. Watches and clocks are liable to go faster in cold weather, and slower in hot, as a result of the E. or contraction of their balance-wheels and pendulums (see article on HEAT for method of correction). Exceptions to the ordinary rule of E. on heating are vulcanised rubber, oxide of copper, and the diamond at low temp., iodide of silver and iron beyond red-heat. Water begins to expand when its temp. is taken below 40° F. (ca. 4° C.); otherwise most bodies contract when the temp. is lowered. Among solids metals are the most expansible by heat. The observed E. of a liquid or gas within a containing vessel is called its 'apparent expansion,' the 'true expansion' being found by correcting for the changed E. of the vessel. When homogeneous bodies are uniformly heated E. takes place equally in all directions, resulting in change of vol. but not of form. In all bodies or systems that are not homogeneous, E. is not equal in all directions, and change of form results from the changes of temp. See also BAROMETER; HEAT; THERMOMETER.

2. In mathematics, the detailed working out of a contracted expression contained in a short statement; the writing out in full of its meaning, or the result thus obtained. Thus the E. of $(a+b)^2$ is $a^2+2ab+b^2$. Among theorems for E. may be mentioned Taylor's and Fourier's (q.v.). See I. Todhunter, *Algebra*, xxxvii, Fourier series.

Expectation of Life is the technical term used to indicate the number of years which any one from any group of persons (males, females, sailors, plumbers, etc.) may live, the attendant circumstances being normal. In other words, it is the mean time which a number of persons at

any moment of age will live after that moment. The same idea is expressed by the Fr. *vie moyenne*, average life—or by the Eng. expression *after life-time*, meaning the duration of life after any particular moment of life. Tables showing E. of L. have been compiled and issued at intervals from 1843, when A. W. Farr, the Deputy Registrar-General, pub. Eng. L. Table No. 1. This was followed in 1853 by Eng. L. Table No. 2, and in 1864 by Eng. L. Table No. 3. These pubs. are also known as Farr's L. Tables, and comprise a large number of tables of annuities and anniversary tables for the estimation of different kinds of life contingencies. Tables showing the E. of L. are used by insurance companies in fixing their premium terms for policies payable at death or at a stipulated age and also their terms for annuities.

Expectorant, drug which aids expectoration and facilitates the removal of secretions from the air passages. The simplest ways of aiding expectoration are: by inhaling steam, medicated sprays containing ammonia, creosote, iodine, carbolic acid, eucalyptus, etc. The drugs taken internally are: ipecacuanha, iodides, and chlorides of potassium, sodium, and ammonium. E.s are used for colds, bronchitis, and other affections of the air passages.

Expeditionary Force, British, see BRITISH EXPEDITIONARY FORCE.

Expenditure, Government. The gross E. of Great Britain in recent years in thousands of pounds (each ending 31 Mar.) is:—

Year	Expenditure
	£000
1904-5	151,769
1913-14	197,493
1914-15 (F. World War)	560,474
1915-16	1,559,158
1916-17	2,198,113
1917-18	2,696,221
1918-19	2,579,301
1919-20	1,665,773
1920-21	1,195,428
1921-22	1,079,187
1922-23	812,497
1923-24	788,840
1924-25	795,777
1925-26	826,100
1926-27	842,395
1927-28	838,585
1928-29	818,141
1929-30	748,712
1930-31	799,170
1931-32 (Two Budgets)	770,599
1932-33	777,070
1933-34	693,419
1934-35	688,879
1935-36	749,979
1936-37	802,886
1937-38 (Nat. Defence)	847,024
1938-39	943,649
1939-40 (S. World War)	1,325,122
1940-41	3,884,288
1941-42	4,775,694
1942-43	5,637,367
1943-44	5,798,421
1944-45	6,062,904

Year	Expenditure
	£000
1945-46 (Exchequer issues)	5,484,400
1946-47	3,910,300
1947-48	3,209,500
1948-49	3,175,800
1949-50	3,375,300
1950-51	3,257,300
1951-52	4,053,600
1952-53	4,350,800
1953-54	4,274,500
1954-55	4,304,700

Experience, really a philosophical term, but a very ambiguous word, and often used in an historical sense referring to the process in the past by means of which we have gained present knowledge. It is a continuous process, widening and extending the knowledge of an individual, and embraces both present and future. Pain, sorrow, pleasure, good and evil, and any change of sentiments and views all come under the heading of E. It is employed in a religious sense also; thus people talk of 'experiencing' religion, that is, becoming converted. The work of the mind, by means of which knowledge grows, is a work of discovery; and actual E., whether it be wide or narrow, is not mere data only, but concrete, definite knowledge. The widest conception of the term is when the whole race is substituted for the individual. Then we obtain a collective E. embracing life as a whole and the knowledge gained by living it. From this all-comprehensive meaning, all other meanings in which the term is used are more or less legitimate abstractions. Primary E. may be reduced to the barest minimum of sensation and feeling, that is to say, a distinction is drawn between what is directly perceived and what is only inferred, and E. can be explained as manufactured out of these immediate or primary data of sense. When regarded in this way, controversy arises between false empiricism and its counterpart, rationalism.

Experiment (Lat. *experiri*, to try), literally the action of trying anything, putting it to the proof or test. It is an important method of scientific inquiry, as opposed to observation; an operation, in science, undertaken either to discover something unknown, or to test an hypothesis and illustrate truths already proved and known. It consists in the arrangement of the elements or essential features of some process, so as to allow observation at will. Laboratory E.s serve to distinguish purely accidental circumstances from the really essential conditions of any phenomenon. In meteorology, biology, and even astronomy E.s play an important part. Newton's law of gravitation was founded on E.

Experimental Embryology is that branch of embryology concerned with the conditions necessary for the development of ova into new individuals, the mode of development, the functions of the various cells formed by the div. of the ovum, and the relative importance of the nucleus and the cytoplasm, both in development and heredity.

Although fertilisation is generally essential for the formation of embryos, there are sev. animals and plants in which the unfertilised ovum develops (parthenogenesis). Fertilised ova of the honey-bee produce females (workers and queens); unfertilised ova develop into males (drones). Aphids produce 2 kinds of ova, one parthenogenetic (see EMBRYOLOGY) the other requiring fertilisation, and many other invertebrates are frequently reproduced by parthenogenetic ova. Experimentally the unfertilised eggs of sea-urchins have been activated by chemical methods. Starfish eggs exposed for a time to a comparatively high temp. develop without fertilisation, and a frog's egg pricked with a needle, will develop parthenogenetically. Such experiments might lead to the conclusion that the egg in itself contains all that is necessary for actual development, and sperms, or physical or chemical stimuli, merely enable the reactions to begin. An additional rôle of the sperm is to carry hereditary factors (see CELL and HEREDITY) and hence the inheritance of the embryo formed by a fertilised ovum is biparental.

The relative parts played by ova and spermatozoa in heredity have been investigated mainly by experimental hybridisation and by inducing sperms to enter enucleated eggs. The general results of such experiments, carried out mainly with various Echinodermata, show that that some characters are transmitted through the nucleus, and therefore inherited from both parents. Characters distinctive of the group to which the animal belongs may be transmitted through the cytoplasm of the ovum, but experiments on the development of enucleated ova activated by the sperm are not yet conclusive, especially since such ova do not usually develop beyond the larval stage. The small amount of cytoplasm provided by the sperm is negligible as an agent in inheritance.

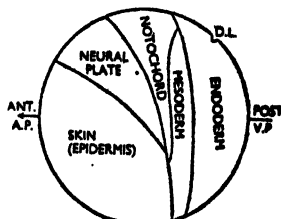
On the other hand, by exchanging the nuclei between 2 species of *Amoeba* the resulting 'hybrid' has properties of both species, so that the cytoplasm must contain inheritance characters here.

When the sperm has entered the egg, a fertilisation membrane is formed, but the view that this prevents, mechanically, the entry of further sperm is doubted, and sev. may indeed enter in larger eggs. The surface of many unshelled eggs has a covering of a hyaluronic acid, which can be broken down by enzymatic secretion of the sperm. A concentration of sperm is needed to break this down before one can enter, which may explain nature's apparent prodigality of sperm, and it has been suggested that the specific nature of the acid and its enzyme may help to prevent accidental cross-fertilisation between species.

By centrifuging eggs it has been shown that some, e.g. *Ascaris*, are of the 'mosaic' type, having their materials arranged in a definite pattern, which is destroyed by the experiment, and consequently the egg develops abnormally. Eggs of frogs and

sea-urchins are not damaged by centrifuging, and in such eggs differentiation of the cells may not take place until after the 5th div. of the ovum.

The stage at which cells become differentiated has been determined by interchanging cells from various parts of the embryo at different stages of development. Undifferentiated cells produce tissue normally formed in the region to which they are transplanted, but differentiated cells, even though the differentiation be invisible, will develop into the kind of tissue they would have produced before transplantation. Since some parts of the embryo induce in the area to which they are transplanted the development of structures which do not normally arise there, they are regarded as 'organisers.' These grafting experiments, and



BLASTULA OF THE AMPHIBIAN FROM THE SIDE, SHOWING THE PRESUMPTIVE AREAS (AFTER VOGT)

Ant. A.P., the animal pole and future anterior end of the embryo; Post. V.P., the vegetative pole and future posterior end; D.L., dorsal lip of blastopore

the discovery of organisers, is associated particularly with Spemann and his collaborators.

Prof. C. M. Child has shown the existence of definite metabolic axes generally approximately coincident with the axes of symmetry in the egg and the embryo. An axial gradient, i.e. a fall in metabolic rate, extends from the anterior to the posterior pole, and from this primary gradient secondary gradients extend laterally, particularly in limb-forming regions. The existence of metabolic gradients has an important bearing on development.

The action of external environment upon the growth of embryonic cells is studied by growing them in culture media. Tissue culture also serves to determine the degree of self-differentiation reached by the cells. Canti and Fell, for instance, have shown that the rudiment of a fowl's leg is capable of development into the various bones, joints, and other parts even when completely isolated in a nutrient solution.

E. E. shows that stages of development are conditioned each by the preceding one. The functions are not irrevocably fixed from the initiation of the cells, but are determined mainly by the relations between the cells themselves and by other environmental factors.

Recently a new technique of *intra-rital staining* has been developed by Prof. Vogt of Zurich, and has cleared up previous obscurities in the process of gastrulation in the heavily yolked egg of Amphibia. Patches of cells on the outside of the segmenting egg (blastula) are coloured by harmless dyes, so that it is possible to observe the subsequent fates of these regions. Thus the egg has been mapped out into *presumptive areas* of ectoderm (sub-divided into skin and neural plate), notochord, mesoderm, and endoderm. The presumptive skin remains on the outside; the remaining areas flow to the blastopore where, in process of being tucked inside the embryo, they come under the influence of the primary organiser, and their fates are then no longer presumptive but are finally sealed. Once the main parts of the embryo have been blocked out, secondary organisers come into play, imparting the detailed structure to the individual organs; the best-known example is the production by the optic cup (rudimentary eye) of a substance which stimulates the overlying ectoderm to sink down and become the lens. See also BIOLOGY.

Experimental Medicine, see MEDICAL RESEARCH.

Experimental Psychology. It has not been found possible to submit all the questions of P. to the test of laboratory experiment, but the method may nevertheless be applied to a considerable number. E. studies of the processes of remembering and forgetting have been carried out, whilst hearing, seeing, feeling, tasting, and smelling have been investigated experimentally.

In the last few years attention has been concentrated upon E. studies of abilities of various kinds. Typically, these studies have proceeded from the devising of tests of various kinds, which have then been applied to large groups of individuals. The wide applications of the tests, and the study of the individuals tested, have enabled the experimenter to know something of the implications of the various scores given for success with the tests. He may then apply them to new individuals, and, from the scores they make in connection with the tests, predict with some confidence the extent to which the individual will show the ability which the test is designed to discover. The application of statistical methods to the interpretation and standardisation of the tests has resulted on the one hand in improvement of the validity and reliability of tests; and, on the other, in the development of new views regarding ability.

In the educational field, educability is estimated by means of intelligence tests. In the industrial field, certain tests have been devised which show whether the person tested possesses the necessary ability to follow callings which demand proficiency in certain operations. In industry, not only have tasks been analysed into combinations of simple operations, but the ability for performing such operations has been experimentally

investigated, and the optimum conditions under which such operations may be carried out by persons with the ability to perform them have also been studied. As a result, the industrial psychologist is finding himself increasingly in possession of reliable information which enables him to advise employers as to whom to engage or reject for specific tasks, and further to inform them as to the conditions in which their output may be raised to an optimum and their work maintained at a constant standard of maximum efficiency. Studies have been, and are being, made of the effect of temp., ventilation, noise, lighting, and other factors on the general behaviour and output of workers. The introduction of bright colours into the decoration of industrial premises, and to the machines in them, has been found to reduce the strain on the worker engaged in repetitive operations. The increasing importance of this dept of P. led to the foundation of the National Institute of Industrial Psychology. See M. Collins and J. Drever, *Experimental Psychology*, 1926; Rex Knight, *Intelligence and Intelligence Tests*, 1933; P. Vernon, *The Measurement of Abilities*, 1939; M. Smith, *An Introduction to Industrial Psychology*, 1943; R. H. Thouless, *General and Social Psychology*, 1951.

Expert Witness, see EVIDENCE.

Exploration, see GEOGRAPHY.

Explosion, the sudden and forcible expansion of certain substances through the action of heat or other cause. This expansion may take the form of the conversion of solids or liquids into gases, or the increase in bulk of gases themselves through chemical changes.

Explosives, compounds or mixtures which can readily undergo chemical changes of an explosive nature. According to the official Brit. list of authorised E., the classes recognised are: gunpowder, nitrate mixture, nitro-compound, chlorate mixture, fulminate, ammunition, firework.

Gunpowder is an intimate mixture of potassium nitrate, charcoal, and sulphur in the proportions 75 : 15 : 10, mainly used for blasting. Gun-cotton (q.v.), or trinitro-cellulose, discovered by Schonbein, 1845, is prepared by the action of a mixture of nitric and sulphuric acids on cotton; other forms of cellulose besides cotton, when nitrated, give nitro-celluloses. Nitro-glycerine (q.v.), chemically glycerine trinitrate, discovered by Sobrero, 1846, is made by the action of nitric and sulphuric acids on glycerine. Kieselguhr (q.v.), a siliceous earth, absorbs it (see DYNAMITE). Blasting gelatin is a mixture of nitro-cellulose and nitro-glycerine. Picric acid (q.v.) (trinitro-phenol) has been used as a filling for high explosive shells. Trinitrotoluene (q.v.) is safer to handle than picric acid and has replaced it in many of its uses. Amatol is composed of trinitrotoluene 20 to 40 per cent and ammonium nitrate 80 to 60 per cent. Ammonal contains powdered aluminium in addition to trinitrotoluene and ammonium nitrate. Cheddite (q.v.) contains potassium chlor-

ate, castor oil, and a nitro-body. Sprengel mixtures contain an oxidising agent such as nitric acid or potassium chlorate, together with a combustible substance like nitrobenzene, petroleum, etc., often admixed just before use.

See ATOM BOMB; BLASTING; BULLET; CARTRIDGE; CORDITE; DETONATOR; FIRE ARMS; INFERNAL MACHINE; LYDDITE; PYROXYLIN; and the subsidiary articles referred to above.

Exponent, or Index. In algebra, the E. or index is a symbol placed just above and to the right of another (termed the base) in order to indicate the power to which that base is to be raised. Indices may be positive, negative, or fractional. Thus a positive index a^1 indicates $a \times a$, i.e. a raised to the second power; a negative index a^{-1} indicates $\frac{1}{a^1}$, or the reciprocal of

a to the second power; while a fractional index $a^{\frac{1}{2}}$ indicates \sqrt{a} , or the square root of a . More generally $a^m \times a^n = a^{m+n}$. This is one of the fundamental laws of algebra, and is the principle behind the logarithm (q.v.) which transforms the practical process of multiplication into addition. A logarithm is merely an E. Similarly $a^m \div a^n = a^{m-n}$, $(a^m)^n = a^{mn}$ and $a^0 = 1$.

The *Exponential Series* depends on the transcendental number e which is derived from the value of $(1 + \frac{1}{n})^n$ when n is indefinitely increased. The expansion of this expression is

$$1 + \frac{n}{n} + \frac{n(n-1)}{2!} \frac{1}{n^2} + \frac{n(n-1)(n-2)}{3!} \frac{1}{n^3} + \dots$$

$$= 1 + 1 + \frac{1}{2!} \left(1 - \frac{1}{n}\right) + \frac{1}{3!} \left(1 - \frac{1}{n}\right) \left(1 - \frac{2}{n}\right) + \dots$$

$$= 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots$$

when n is infinite. Then the number

$$e = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \dots = 2.71828 \dots$$

and is the natural logarithmic base for theoretical purposes. **See** LOGARITHM; HERMITE, CHARLES.

Export-Import Bank of Washington, estab. in 1934 and reincorporated in 1945 as an independent agency of the U.S.A. Gov. to aid in financing and to facilitate the exports and imports of the country. In the 21 years to 1955 it authorised a total of \$7,200,000,000 in loans or guaranties in 65 countries.

Exports, see TRADE AND COMMERCE; FREE TRADE; PROTECTION.

Express, see POST OFFICE, *Express Delivery Service*.

'Express, L', Paris weekly, founded in 1953 as a left-wing political paper. After having been enlarged by literary and other pages, its circulation rapidly rose from a few thousand to 150,000 in 1955. Among its contributors are the Fr. politician Pierre Mendès-France (q.v.), and the writers François Mauriac, Albert Camus, André Malraux, and Alfred

Savvy; contributors in England include Aneurin Bevan (q.v.) and the cartoonist Vicky.

Expressionism, form of art which endeavours to express the inner life of the artist, in which process the objective content is but a means to that end, wherein the subjectivity of the artist engrosses the interest so much that the external object may not dispute its supremacy, and either disappears or becomes much changed. In brief, subjective presentation accompanied by distortion of nature which may be pressed to the point of unrecognisability or suppression of all external reality. According to Max Raphael 'Art should merely reproduce the artist.' For a proper appreciation, or perhaps interpretation, of a picture, the critic will require to translate the detail of the picture as symbolic of some experience, whether physical, intellectual, or spiritual, of the artist, much as psycho-analysts interpret the recollected incidents of dreams. The movement towards E. arose in the last quarter of the 20th cent. as a reaction against Impressionism (q.v.) chiefly in Germany, Russia, and the Scandinavian countries. The Norwegian, Edvard Munch (q.v.), thus expressed a pessimistic or melancholy outlook repeated in some followers in Germany. Kandinsky, Klee, and Kokoschka are expressionists, so also was Vincent van Gogh. Variations of E. are to be found in the products of Cubism, Futurism, Constructivism, and Surrealism, while the cinema had its expressionist film in *The Cabinet of Dr. Caligari* (Robert Wiene, 1919).

The term E. properly belongs to painting, but can be loosely applied in music to composers who aim at the interpretation of moods and states of mind, not by the accepted symbols of romanticism, but by apparently unrelated abstractions, and in literature to writers like Kafka and James Joyce and many modern poets who express their inner truth in the raw symbols that spring from the unconscious. **See** C. Marriott, *Modern Movements in Painting*, 1921; A. Pope, *The Painter's Mode of Expression*, 1929-31; S. W. Cheney, *Expressionism in Art*, 1948.

Extension, a term used of any given term to describe the total number of objects to which it may be applied, being practically synonymous with 'Denotation,' and opposed to 'Intension' or 'Connotation,' which are used of the attributes essential to the conception of the term. **See** CONNOTATION AND DENOTATION.

Extortion, in Eng. law, the term applied to the improper, premature, or excessive exaction of money or money's worth by public officers; also to such exaction by means of threats of personal violence or blackmail (q.v.). E. is regarded as a misdemeanour by the common law. **See** THEFTS.

Extra-territoriality, or Exterritoriality, term of international law, which denotes the exclusion of certain individuals from the rule that everybody within the

boundaries of a state is subject to the laws of that state. It is also used to describe the quasi-E. of the dwelling-place of an accredited diplomatic agent, and of public ships of one state when cruising in other waters than their own. Generally speaking, all cases where a state refrains from enforcing its laws within its own ter. are cases of the operation of the principle of E. The persons who come under this rule are those of foreign sovereigns, whether travelling under an incognito or not, ambas., ministers plenipotentiary, and other accredited diplomatic agents. Not only are the persons of these included, but their suites also, and their belongings. Public ships in foreign waters also enjoy the rights of E. Consuls are not as a rule included, save in some non-Christian countries. In certain non-Christian states also E. has been granted by treaty to the subjects of contracting Christian states who are resident therein (see CAPITULATIONS). Brit. settlements in the Far East were subject to the conditions of the treaties by which they came into being. In the period 1928-37 the Nationalist Gov. of China had 2 main lines of policy: to achieve uniformity of political structure and administrative control within China, and to strengthen and modernise the country. The gov. showed a high degree of skill in dealing with foreign interests. Here the primary problem was the old yearning of the foreign interests for a 'strong man' to run China on their behalf. These interests were then still conservative in their attitude and disposed to resent any attempt of the Chinese Gov. to make foreign enterprise respect the national interests of China. They obstinately clung to the theory that the foreign concessions and the system of E. were essential safeguards of 'law and order'—although disorder and corrupt politics were still fostered by the ability of all Chinese war lords, and others who got rich in unpatriotic ways, to put their money in foreign banks in the foreign concessions, safe from taxation or any form of Chinese control. These foreign interests would have liked nothing better than to make Chiang Kai-shek their strong man. But Chiang Kai-shek built up the strength of the gov. and its international credit without allowing foreign control to increase either politically or financially. Gradually he succeeded in committing America and Britain, among the great powers, not only to the support of the Chinese Gov. but to progressive relinquishment of their privileges and restoration of the sovereignty of China, so that Japan stood more and more isolated both as the advocate of territorial and political imperialism in China and as a rival threatening Amer. and Brit. interests. As early as 1931 the Chinese National Gov. announced the abolition, as from 1932, of extra-territorial rights of foreigners resident in China. This announcement followed China's refusal to accept the Powers' demands that foreign jurisdiction should continue at Shanghai, Canton, Tientsin, Peking, and Hankow. It was

further announced that courts for the trial of criminal and civil cases involving foreigners were to be estab. in special areas, including Shanghai, Tientsin, Mukden, and Canton; but these decisions could not then be implemented owing to the capture of all these cities by the Jap. invaders. In 1942, however, the Brit. and U.S.A. Govs. relinquished extra-territorial rights in China, Gen. Chiang Kai-shek in Oct. of that year sending messages of appreciation to Mr Churchill and Mr Roosevelt for their gesture of friendship and goodwill manifested in their determination to abrogate E. in China and thereby to allow China to assume the full stature of an independent democratic nation. There were formerly similar agreements or capitulations with Turkey for securing immunity to foreigners in that country or in its dependencies, including Egypt. An exceptional case of E. was that granted to the residence of the pope by an It. law. When armies are allowed by another gov. to cross the borders of their own state, they thereby come into possession of extraterritorial rights. It was laid down in the arbitration of the *Alabama* case that the extension of E. to ships was not the law of nations or an absolute right, but simply an act of courtesy; such a view is not in accord with the universal practice. The extension of immunity to vessels owned by states and engaged in trade was an issue before the Eng. courts in *The Porto Alexandre*, 1920, in which case the Court of Appeal, in spite of the commercial difficulties that might arise, felt bound in view of the prevailing fashion of internationalisation to follow the decision in *The Parlement Belge*, 1878, where the fact that a ship had been declared by a foreign sovereign to be in his possession as sovereign was held to be conclusive and to confer immunity from the local jurisdiction.

Extracts are solutions or syrups containing one or more substances that have been removed from admixture with others by means of a solvent. The methods of extraction depend on the particular case, but as a rule the solvent, which may be water, alcohol, ether, acetic acid, etc., is poured over the crushed or powdered substance and, after standing, is strained off. The substance is said to be macerated if the solvent is cold, and digested if warm. When the substance is boiled with the solvent a decoction results. Many forms of apparatus for performing extractions have been devised, with a view to minimising the amount of solvent used, and thus rendering the subsequent concentration of the E. a less tedious process.

Extradition (Lat. *ex*, out, and *traditio*, handing over), the giving up of a person accused of crime to the gov. in whose ter. the offence was committed by the gov. in whose ter. he has taken refuge. Great Britain has entered into E. treaties with practically all civilised nations; the offences for which E. is permissible are naturally all of a serious nature, including arson, murder, piracy, embezzlement, etc. In most states offences of a political nature

do not allow of E.; such offences are not those with a political motive, but those which 'are incidental to and form part of political disturbances.' Criminals are not given up unless some specific treaty is in existence with the gov. requiring them, and in Eng. law the gov. has no power to surrender a fugitive criminal without express statutory authority. It is necessary to show the offence enumerated and the specific treaty, and also that the acts with which the fugitive is charged amount to the alleged offence according to the laws of both the gov. concerned. The authority in Great Britain is contained in the Extradition Acts of 1870-3. The fugitive can be tried only on the specific charge for which he was given up. Whether a state is called upon to give up its own subjects varies with different nations; the procedure followed between Great Britain and other nations is briefly as follows. With France and Germany neither gov. surrenders its own subjects; with Spain and Switzerland Great Britain only surrenders them; with Russia, Belgium, and the Netherlands it is optional. If a Sp. subject committed a crime in Switzerland and took refuge in England, the Brit. Gov. would surrender him to Switzerland only after the consent of Spain had been obtained. A fugitive is committed on the same evidence as for an ordinary crime, but is not surrendered until a diplomatic representation of the gov. demanding him has been addressed to the secretary of state. In the U.S.A. foreign E. is not regulated by the individual states but by the Federal Gov. When a demand is made for E., the accused is handed over if his probable guilt is estab. at a preliminary examination before a commissioner or judge. An E. treaty embraces all previous crimes committed by the same person. Inter-state E. is provided for by Act of Congress under the Constitution. The fact that an act may be no crime in one state does not debar another where such act is a crime from demanding surrender. Release by writ of *Habeas Corpus* is the procedure on an improper surrender. See also FUGITIVE OFFENDERS ACT, 1881; POLITICAL OFFENCES.

Extrados, in architecture, the curved upper surface or back of an arch. See ARCH.

Extravasation, passage of fluid from a vessel. The term is also applied to the passage of fluid from a hollow organ by bursting or perforation. E. of blood is the most commonly seen, as in a bruise, the size of which depends upon the amount of blood that leaves the damaged vessels, and the changes that a bruise goes through are caused by the alteration in the blood pigments. The extravasated blood is either absorbed or remains fluid, and may have to be drawn off in the case of a haematoma (see BRUISE). Haematoma may become infected with bacteria and form an abscess.

Extremadura, see ESTREMADURA.

Extreme and Mean Ratio, in geometry, a phrase used of the proportional div. of

straight lines. Thus if AB is a straight line, and the point of div. is at C, the line will be divided in extreme and mean ratio, or medial section, if the ratio $AB : AC = AC : CB$, or $AB : BC = AC^2$. The term is used by Euclid, who states the problem in Book II, problem 11, where the case of internal section alone is considered, but a line can also be divided *externally*, in medial section.

Extreme Unction, sacrament of the Rom. Catholic Church, reserved to those at the point of death. It is believed to give spiritual aid to the person receiving it and also, when God so wills, to restore bodily health. The custom of anointing the sick with oil doubtless had its origin in the counsel of St James (James v. 14), but it is noteworthy that this passage makes the cure of the sick person the object of the act. There are still traces of this primitive view in the Rom. rite of unction. In the Gk Church the ceremony is known as 'The Holy Oil,' or 'The Oil of Prayer,' and the primitive view has remained more fully. In the 1549 Book of Common Prayer, a form of unction was given, but this has since been omitted. The practice of unction of the sick with the primitive intention has lately been revived in the Eng. Church with episcopal consent.

Exuma, Great and Little, 2 is. of the Bahamas (q.v.). Exumas is the name of a dist. comprising sev. is. (area c. 100 sq. m.; pop. 3800). Tongue of Ocean separates the Exumas from Andros Is. on the W.; Exuma Sound separates them from Eleuthera Is. and Cat Is. on the E. The chief tn is Georgetown, to the NW. of which is the U.S.A. airfield, facing Exuma Sound.

Eyam, vil. of W. Derbyshire, England, 10½ m. NE. of Buxton, in a dist. noted for its geological interest and its Brit. and Saxon antiquities. In E. churchyard is a 9th or 10th-cent. runic cross, restored by John Howard in 1788. Three-quarters of the pop. of E. d. of plague in 1665-6. Anna Seward, the 'Swan of Lichfield,' Richard Furness the poet, and John Nightbroder, founder of the Carmelite Priory at Doncaster, were b. here. Industries include the manuf. of shoes and flintspars, and lead mining. Pop. 1200.

Eyasses, see FALCONRY.

Eyck, Hubert Van (c. 1379-1426), early Flem. painter, probably b. Maaseyck on the R. Maas, who lived at Bruges and later at Ghent. He is presumed to have worked in conjunction with his brother Jan (q.v.), being appointed together with him by Philip of Charolais as court painter at the Hague in 1422. It is incorrect to say that they invented painting in oils, but certainly the Van Eyck technique is remarkable for transparency and brilliance of colouring. To Hubert is attributed the general design and some part of 'The Adoration of the Lamb,' the famous altarpiece in the cathedral at Ghent, which an over-inscription ascribes to both painters; but it is only on evidence of style that any other work can be attributed to him, and on this evidence expert opinions differ. See studies of the

Van Eycks by Weale, 1908; Weale and Brockwell, 1912; C. de Tolnay, 1939.

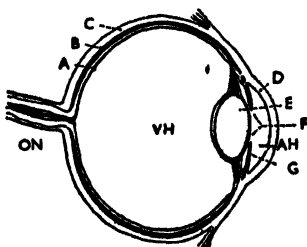
Eyck, Jan Van (c. 1390-1442), early Flem. painter, brother of Hubert (q.v.), and like him b. at Maaseyck. During Hubert's lifetime he is presumed to have worked with him, and to have completed their joint work, 'The Adoration of the Lamb.' He also became court painter to the duke of Burgundy in Lille. He d. at Bruges. Some experts ascribe a greater power of conception to Hubert, but Jan is undoubtedly a great master in his own right, superb in portraiture, detail, and technical brilliance. His prin. signed and dated works include the famous pictures in the National Gallery, 'Portrait of "Timotheus"' 1432, 'The Man with the Turban,' 1433, the wonderful masterpiece 'The Marriage of Giovanni Arnolfini and Giovanna Cenami,' 1434, the 'Vierge du chanoine van der Paele,' (Bruges), 1434, the 'Vierge à la fontaine' (Antwerp), 1439, and 'Portrait of the Artist's Wife (Bruges), 1439. See studies by Weale, 1908; Weale and Brockwell, 1912; C. de Tolnay, 1939. For comment on the technical 'Secret of the Van Eycks' see Appendix to Sir Charles Holmes's *National Gallery*; vol. II, The Netherlands.

Eyck, Margaret Van, a painter, sister of Hubert and Jan. She lived a retired life as a member of the order of Our Lady of Ghent, and d. before 1431, being buried in the cathedral of Ghent. She is believed to have executed some miniatures in the missal of the duke of Bedford.

Eye. Tn of Suffolk, England, on a trib. of the R. Waveney, 20 m. N. of Ipswich. Formerly a centre of the pillow-lace industry. Its charter was granted in the reign of King John. Pop. 2000.

Eye. The E. is one of the higher sense organs, and like those of hearing and smell, it consists of an essential part and an accessory part. The organ of vision, strictly speaking, consists only of the eyeball, but it is also necessary to discuss its many important appendages. The eyelids, fringed by the eyelashes (*cilia*), consist of integument with a thin layer of dense fibrous tissue strengthening their margins. They are closed by the *orbicularis muscles*, and the upper is raised by the *levator palpebrae*. The *meibomian glands*, which secrete sebum, open on the free margin of the eyelids. A layer of mucous membrane (*conjunctiva*) lines their inner surface and is continued over the front of the eyeball. The upper lid is the larger and more movable, and joins the lower at the inner and outer *canthi*. Near the inner *canthus*, on each lid, will be seen the slight elevation (*papilla lachrymalis*) pierced by the *lachrymal canal*, which is the drainage channel for the fluid from the conjunctiva; this fluid is continuously secreted by the *lachrymal glands*, which are situated in the outer angle of the orbit, one above and one below. The reflex action of winking distributes the fluid over the ball and thereby washes it. The lachrymal canals from

above and below converge and open into the *lachrymal sac*, the upper slightly dilated end of a duct, about $\frac{1}{2}$ in. in length descending to the nose. Stimulus of the lachrymal gland by pungent vapours or the stress of strong emotions may result in an excessive secretion of the fluid exceeding the capacity of the *lachrymal duct* and tears result. The conjunctival mucous membrane becomes continuous with the nasal mucous membrane by means of the lachrymal canal. The globe of the E. is not perfectly spherical, its antero-posterior diameter being about $\frac{3}{4}$ of an in., as also is its vertical, but the transverse diameter is usually a little longer, about 1 in. The eyeball consists of 3 concentric coats and of certain fluid and solid parts enclosed by them, viz. (a) the tough, firm, fibrous external coat, the *sclerotic* and *cornea*;



DIAGRAMMATIC SECTION OF THE EYE

ON, optic nerve; A, retina; B, choroid; C, sclerotic; D, cornea; E, crystalline lens; F, pupil; G, iris; VH, vitreous humour; AH, aqueous humour.

(b) a middle vascular pigmented and in part muscular membrane, the *choroid* and *iris*; (c) an internal nervous and epithelial layer, the *retina*. The corneo-sclerotic case is kept in shape by (i) the *aqueous humour* which distends the cornea; (ii) the *vitreous humour* which fills the less convex sclerotic chamber; these 2 humours are separated by the *crystalline lens*. The whole may be represented as a 'water-camera' of the highest degree of perfection and adaptability.

A brief description of each of the above parts follows. The sclerotic coat is a strong, opaque, fibrous structure extending over about five-sixths of the eyeball. Its outer surface is pearly white; its inner is of a light brown colour. The remaining sixth, although not changed essentially in character, is transparent, and is termed the cornea. The cornea is normally from $\frac{1}{8}$ to $\frac{3}{8}$ in. in thickness. The choroid coat is a thin membrane, and supports in its outer layers the larger arteries and veins of the E. Its inner stratum is covered by hexagonal pigmented cells; these, which were formerly considered as part of the choroid, belong in reality to the retina. Near the corneo-sclerotic junction the choroid becomes raised up into a number of longitudinal ridges or puckers (*ciliary*

processes) arranged meridionally and forming a circle. The *iris* at its circumferential border is continuous with the choroid. It is a curtain with a round hole (pupil), and is provided with circular and radiating unstriped muscular fibres which adjust the size of the pupil. (Though unstriped, these fibres contract with extreme rapidity.) The pigment cells of the iris vary in different individuals, and the different colours of E.s are partly dependent on the amount and distribution of the contained pigment. The retina is the delicate membrane containing the expanded termination of the *optic nerve*. It varies in thickness from $\frac{1}{16}$ to $\frac{1}{8}$ in., and forms the lining between the choroid and the vitreous humour extending nearly to the outer edge of the ciliary processes; its indented border is termed the *ora serrata*. It, for the most part, is of even texture and smooth surface, but almost exactly opposite the middle of the posterior wall is a slight circular depression (*yellow spot*), and not far from this, towards the nasal side of the eyeball, is a radiating appearance produced by the spreading of the optic nerve at its point of entrance.

It is impossible within the limits of this account to deal with the microscopic structure of this wonderful membrane. No less than 8 distinct strata build it up, of which only 4 are here mentioned. The innermost layer is one of nerve fibres, and lying next to this is the layer of nerve cells; the outermost layer consists of the pigment cells previously mentioned, and immediately within is the layer of rods and cones, the former far exceeding the latter, except in the yellow spot. These bodies are closely packed, and it is suggested that each rod or cone conveys but one impression, so that any image, even microscopic in size, must be the result of combined impressions from a number of rods and cones. The *aqueous humour* is a watery solution of saline and organic material, while the *vitreous humour* is of a soft gelatinous consistency, and serves as a support for the delicate retina from which, in most parts, it may be readily separated. The crystalline lens, about 11 millimetres in diameter and 3.6 to 3.9 millimetres thick at the centre, is a transparent solid body, double convex in shape and enclosed by an elastic capsule, with attached suspensory ligaments subject to varying tensions. Its posterior convexity is the greater. It is composed of a number of concentric laminae, resembling the coats of an onion, and each lamina is composed of ribbon-shaped fibres built together in a peculiarly curved manner. The lens, which is practically spherical in the foetus, becomes more and more flattened with advancing age.

The action of the E. is roughly as follows: beams of light (parallel if from an object 20 or more ft away and divergent from nearer objects) from any one point in an object strike all over the surface of the cornea which gathers them slightly together, refraction follows in the aqueous humour, and the lens brings them to a focus in normal vision on the retina. The

rods and cones are affected by the image, and in consequence cause disturbances and stimuli in the nerve fibres and an impulse is transmitted via the optic nerve to the brain. The adjustment of the dioptries of the E. whereby it is able to focus the image of both far and near objects is called *accommodation*. It is brought about by a change in the convexity of the anterior surface of the lens. When the E. is accommodated for distant vision the ciliary muscles draw the suspensory body taut, which results in a flattening of the anterior surface of the lens. Conversely, in accommodation for near vision the ciliary muscles relax and the anterior surface of the lens becomes more convex. The complete act of accommodation for a near object comprises, besides an increased convexity of the lens, convergence of the E.s and constriction of the pupil. The muscles which move the eyeball are 6 in number, 4 *recti* and 2 *obliqui*; and by means of the contractions of these six muscles the eyeballs may be moved in any desired direction.

Double vision, or *diplopia*, is the name given to an optical abnormality in which 2 images of the same object are seen. If the diplopia concerns 1 E. only it may be the result of some abnormality of refraction in the E. concerned, but if it disappears when either E. is closed, thus showing that both E.s are concerned in its production, it is true diplopia, and may be due to a transient weakness of the ocular muscles which will pass off, or to a squint (see SQUINTING). It may be the first warning of the disorder called disseminated sclerosis, or of the rare condition known as myasthenia gravis. A case of diplopia should therefore receive expert attention. The so-called double vision found after alcoholic excesses, in attacks of migraine, after the taking of drugs, etc., is really only blurred and muddled vision. *Nystagmus*, a condition in which the E.s are continually moving in a rhythmical fashion, from side to side, or up and down, or with a circular motion, is present in disease of the labyrinths or semi-circular canals which control the balance of the body. Sometimes it is due to disease of the E.s or of the parts of the nervous system which are connected with them. A form of nystagmus, known as miners' nystagmus, used to be common in miners and in many cases was thought to be due to a neurosis. The *Argyll Robertson pupil*, called after the Edinburgh physician who first described it, is the name given to the condition in which the pupils do not react to light but do contract in accommodation.

Wounds and foreign bodies.—Any irritation to the E. causes such intense pain to the individual that he usually seeks to remove the cause at once. This is one of Nature's ways of safeguarding sight, which is among man's most precious possessions. Every injury to the E. should receive immediate attention. Careful treatment of injury or inflammation in the early stages may avoid loss of sight in the damaged E. The most frequent accident to the E. is undoubtedly

the entrance of a foreign body such as a small particle of dust, splintered wood or metal, or coal, or road grit. When a particle falls on it, the E., will water and thus the article may be washed to the corner of the E., where it can be removed. Never rub the E. which has grit in it, but blow the nose and the particle may be dislodged so that it can be removed with the corner of a clean rag or handkerchief. If the foreign body be wedged under the upper lid, a few drops of a bland oil, such as castor oil, may be dropped into the E. in the hope that the particle will float out. If this is unsuccessful, gently grasp the rim of the lid and pull it out and downwards, pushing up the lower lid under it. Release the upper lid, and as the lids slide apart again, the particle is very often carried out on the lashes of the lower lid. If these first-aid measures are unsuccessful, no further attempt should be made, but the patient should be taken at once to the doctor. In the case of larger particles which are apt to enter the E.s of workers in such places as steel works, expert advice should be obtained at once. The cornea is subject to ulceration of various kinds. Even such a small wound as a tiny scratch may lead to inflammation and ulceration. Children from poor and dirty homes often develop these ulcers, sometimes in conjunction with tuberculous glands in the neck. Older people in poor health are prone to corneal ulcerations. When inflammation is present in the cornea without actual ulceration, the condition is called keratitis. All corneal inflammations require expert advice and treatment.

Wounds of the Eye.—Any sort of wound may happen to the E., and accidents in which rods of metal or wood, such as prongs of pitch-forks, tools of all sorts, projecting parts of cars or furniture, stones, golf-balls, elbows and fingers at football, etc., enter the E. and lacerate it are fairly frequent. First-aid treatment only should be attempted, and the patient should as soon as possible be taken to the doctor, or the doctor be sent for if there is collapse from the shock and pain, which is often severe. The E. may be covered with a pad of wet boracic lint, and bound up with a bandage. Hot tea or coffee or other stimulant may be given to restore the patient. The worst aspect of an E. accident is the risk that the other, sound, E. may become involved, and loses its sight, even though the damaged E. may recover. The reason why this condition, known as *sympathetic ophthalmitis*, should occur is not known.

Black eyes, in which the tissues round the E. become suffused with blood and discoloured, are common. The usual cause is a bruise (q.v.) in the region of the E. caused by a blow or knock, but sometimes black E.s occur after such happenings as operations on the nose. In a few days the blood which has collected in the tissues will be absorbed, and the dark colour will fade through shades of yellow to a normal colour again. Immediately after a blow has been struck on the E.,

cold wet cloths should be applied, or the part should be covered with pads of cotton wool soaked in weak lead lotion. This treatment, if applied soon enough, may prevent a black E. from forming. If a black E. develops in spite of these precautions, hot compresses may be used to relieve any pain.

Other conditions and diseases of the E. and eyelids are described under: *ASTHENOPIC; ASTIGMATISM; CATARACT; CONJUNCTIVA AND CONJUNCTIVITIS; EYELIDS; SORE; GLAUCOMA; MYOPIA; OPHTHALMIA; PINK EYE; SQUINTING; STYE; TRACHOMA. See also BLIND; COLOUR-BLINDNESS; OPTICS; SPECTACLES; VISION; DEFECTS OF; REFRACTION, ERRORS OF.*

Eyebright, see EUPHRASIA.

Eyelids, Sore or Inflamed, see BLEPHARITIS.

Eyemouth, burgh of Berwickshire, Scotland, at the mouth of the R. Eye, 8 m. NW. of Berwick. It has a fishing industry. Pop. 2270.

Eyes, Propagation by, in plant culture, consists in carefully cutting out the eye, as it is called, and planting it afresh; this soon shoots out and becomes a new plant. The best-known example of this form of propagation is the potato.

Eyra, native South Amer. name for a species of wild cat, *Felis eyra*, which ranges through the W. hemisphere from Mexico to Paraguay. It is reddish-yellow, with white spots on the face, and is about the size of the domestic cat.

Eyre, Edward John (1815-1901), Brit. colonial governor and Australian explorer, son of a Yorks vicar. He emigrated to Australia, becoming a squatter on the Lower Murray R., a stipendiary magistrate, and protector of the aborigines. He undertook difficult journeys to prove the possibility of an overland route between S. and W. Australia. Starting in 1841, he reached Albany in about 5 weeks, publishing an account of his journey in England as *Discoveries in Central Australia*, 1845. In 1846 Grey appointed him lieutenant-governor of New Zealand. He was transferred to the West Indies in 1854, governing St. Vincent and Antigua, and finally became governor of Jamaica in 1862. E. took stern measures to suppress the negro rising there (1865). For this he was superseded by Grant, and prosecuted by a committee of which J. S. Mill was president. Carlyle and Kingsley were on the committee for his defence. He was acquitted in 1867, and retired with a pension. *See W. L. Mathieson, The Sugar Colonies and Governor Eyre, 1849-1856, 1936; Lord Olivier, The Myth of Governor Eyre, 1933; M. J. L. Uren, Waterless Horizons: Life-story of Edward John Eyre, Explorer, Overlander and Pastoralist in Australia, 1948.*

Eyre, Sir Vincent (1811-81), gen. who served in Afghanistan (1841-2). His *Military Operations at Cabul . . . with a Journal of Imprisonment in Afghanistan*, pub. in 1843, gave an account of his 8 months of captivity with Akbar Khan. He fought in the Indian Mutiny, being with Havelock and Outram at the relief of

Luoknow. See memoir by Malleson (*Recreations of an Indian Official*, 1872).

Eyre, Lake, lake in S. Australia. It is 4000 sq. m. in area, but in the dry season it becomes a mere salt marsh. Lakes Gairdner and Torrens are similar in character—i.e. when the supply of water is least the evaporation is greatest, whereas in the case of most lakes both supply and evaporation are more or less constant at all seasons.

Eyre-Todd, George (1862-1937), author and editor, b. Glasgow. Educ. at Glasgow High School and Univ., he was editor of *The Scottish Field* from 1908 to 1913, and later of *Scottish Country Life*. Most of his pubs. deal with Scottish hist. and topography. They include *A Sketchbook of the North*, 1890, *Byways of the Scottish Border*, 1892, *Scotland, Picturesque and Traditional*, 1895, *Byways of Scottish Story*, 1900, *The Glasgow Poets*, 1902, *The Story of Glasgow*, 1911, and *The Highland Clans of Scotland*, 1928. *The Legend of Languoreth*, 1922, is a book of verse. He also made a trans. of Harbour's *Bruce*, 1907, and pub. eds. of Ossian's *Poems*, 1888, and *Ancient Scottish Ballads*, 1894.

Eyres Peninsula, triangular piece of land on the S. coast of S. Australia, lying between Spencer Gulf and Anxious Bay, its base being formed by the Gawler range.

Eysteinn Asgrímsson (d. 1361), Icelandic monk, author of *Lilja* (The Lily, i.e. Our Lady), the greatest religious poem of medieval Iceland (twice trans. into Eng.).

Eyston, George Edward Thomas (1897-), racing motorist and consulting engineer; educ. at Cambridge Univ., where he was a rowing blue. After service in the First World War he took up motor racing and in Nov. 1937 he broke the world's land speed record with an average speed of 312.20 m.p.h., and again in Sept. 1938 at Bonneville Salt Flats, Utah, U.S.A., in his 'Thunderbolt' with an average speed of 357.5 m.p.h.

Ez Zebdani, prosperous tn of Syria, about 20 m. NW. of Damascus, surrounded by celebrated apple orchards and vineyards. Not far off is a remarkable rock-pinnacle, resembling an uplifted finger, which appears to have been a sacred pillar worshipped as a Symbol of Baal Moloch.

Ezekiel ('El (God) will make strong'), the prophet described (Ezek. iv.) as 'the priest, the son of Buzi,' by his editor, the only extant reference by an ant. writer to him. He was carried into Mesopotamia by Nebuchadnezzar with Jehoiachin, king of Judah, and settled at Tel-abib on the R. Chebar in 597 bc. Here (592 bc) the call to prophesy came to him. He did so for 22 years. E. was both prophet and priest, and the influence of Jeremiah is particularly strong in his writings. The authenticity of the book of E. has never been seriously questioned. It falls into 2 parts, the div. coming at the end of chapter 32 or chapter 39. Chapters 1-39 fall into 3 divs.: (1) before the siege of Jerusalem, threatening the complete overthrow of the kingdom of Judah on account of its alienation from God; (2) during the

siege, threatening the surrounding nations with divine punishment for their scorn of Judah; (3) after the siege, an exultant prophecy of the future. See J. Smith, *The Book of Ezekiel*, 1931; J. Harford, *The Book of Ezekiel*, 1935; A. Guillaume, *Prophecy and Divination*, 1938; H. W. Robinson, *Two Hebrew Prophets: Studies in Hosea and Ezekiel*, 1948.

Ezo, see YEZO; HOKKAIDO.

Ezra and Nehemiah, the Books of, naturally form 1 work, both being continuations of the books of Chronicles compiled by the same author (see CHRONICLES). The book of E. falls into 2 parts, of which the first, chapters i-vi., tells the hist. of the Palestinian Jews from the 1st year of Cyrus down to the 6th year of Darius Hystaspes. Of this section, the portion from iv. 8 to vi. 18 is written not in Hebrew, but in Aramaic, the common tongue of the Semitic peoples at this time. The second div. of the books, chapters vii-x., describes the return of E. and his company in the 7th year of Artaxerxes, and his action with reference to the mixed marriages. In the original, chapter vii. 12-26 is in Aramaic. The book of N. tells how that Jewish leader was sent by the Persian king as governor of Jerusalem to restore the walls of the city, and describes the manner in which he carried out his work in face of the opposition of Sanballat. There are some difficulties in regard to the chronology of the 2 books which have not yet been cleared up. It has been agreed (see L. E. Browne, *Early Judaism*, 1920) that N. historically preceded E., but if Albright is correct in ascribing the authorship to E., that cannot be maintained. See H. H. Howorth, *Unconventional Views*, 1901; G. Bosc and W. Sanday, *The Ezra Apocalypse*, 1912.

Ezra (Esdras) the Scribe, descendant of Sherajah the high-priest put to death after the taking of Jerusalem by Nebuchadnezzar, first appears as an exile in Babylon during the reign of Artaxerxes Longimanus. After the 7th year of the reign of Artaxerxes, he was permitted to lead 1400 to 1600 men, women, and children back to Jerusalem. On arrival at Jerusalem, E. found that the Jews had intermarried with the surrounding nations contrary to the Law of Moses and he called upon them to put away these wives. E. is noted as a restorer of the text of the law, and was held in high repute by later Jews. According to an erroneous Jewish tradition the canon of the scripture was fixed by him presiding over 'The Great Synagogue,' and no book could be thought inspired after his date. This may have led to the adoption of pseudonyms by Jewish religious authors (cf. the apocryphal 2 Esdras xiv. 42 ff. of c. AD 95). See W. Robertson-Smith, *The Old Testament in the Jewish Church*, 1892; C. C. Torrey, *Ezra Studies*, 1910; L. E. Brown, *Early Judaism*, 1920; J. Stafford-Wright, *The Date of Ezra's Coming to Jerusalem*, 1946.

Ezzelino la Romano (d. 1259). It. Ghibelline leader with such a reputation for cruelty that he was called 'the tyrant,' and he is so pictured in Dante's *Inferno*.

F

F: 1. Sixth letter of the Eng. alphabet, had originally (i.e. in the Semitic alphabet) the phonetic value of *v-w*, and was called *vaw*. A form of it became the Gk *digamma*, which was a consonant having the value of *w*. In some Gk dialects, however, there was no need for this letter, and it was given up; in others it survived, but gradually it was discontinued and finally it only survived as the numeral 6. Another form of the Semitic *waw* became the Gk *upsilon* (see the letter U). The Etruscan alphabet, being of early Gk origin, contained the *digamma*. The Etruscans, however, expressed the sound *f* either by a sign having the form of figure 8, or by the combination *w-h*. Also the Romans adopted this combination to express the sound *f*, but at a later stage the *h* was dropped. Thus the Gk *digamma* (F) came to represent the Lat. sound *f*, whereas the Gk *upsilon* was adopted both for the consonant *v* (q.v.) and the vowel *u* (q.v.). The Lat. F was taken over by all alphabets descended from the Rom. character.

F is a 'voiceless labio-dental spirant.' Etymologically it corresponds in general to the Gk π . Cf. Eng. 'father,' Gk *pater*; 'foal' and *pólos*; 'five' and *pente*; 'fire' and *pur*. In O.E., if between 2 vowels, *f* was pronounced like *v*. In Mod. E., the word 'of' is the only example of this sound for *f*. See ALPHABET.

2. In music, the 4th note in the ascending diatonic scale of C, major and minor, the sub-dominant of the key of C. The bass or F clef is on the 4th line of the staff, the note on that line being F, and the other notes above and below being named accordingly (*g*, *a*, *b*, etc.). The scale having the note F as its tonic is the scale or key of F. F major has 1 flat as its key signature, F minor 4 flats. A lower-case italic *f* represents 'forte' (loudly) in music; *ff* stands for 'fortissimo.'

F., **Fahr.** (abbreviation for **Fahrenheit**), name of a thermometer, and of a scale of temp. on which the melting-point of ice is 32° F. and the boiling-point of water is 212° F. See FAHRENHEIT THERMOMETER.

Fabroni, A., see FABRONI, A.

Faber, Cecilia Francisca Josefa Böhl von (1797-1877), Sp. novelist, who used the pseudonym 'Fernan Caballero,' b. Morges, Switzerland, of a Ger. father and a Sp. mother. In 1813 her parents settled in Cádiz. Her first novel, *La Caviota*, 1849, created the type of the Andalusian vill. romances in Spain. She also pub. *Cuentos y Poesías populares Andaluces*, 1859, the earliest collection of Sp. folk-tales and songs. Her *Obras completas* were ed. in 18 vols., 1893-1914. See A. Palma, *F. Caballero, la novelista novelable*, 1931.

Faber, Frederick William (1814-63),

Oratorian and hymn-writer, nephew of G. S. Faber, b. Claverley, Yorks. Till 1845 he remained a clergyman of the Anglican Church, and was then converted to Rom. Catholicism, and was ordained priest. He founded a religious community at Birmingham, later merged in the oratory of St Philip Neri, with Newman at the head. In 1849 a branch was formed in London, with F. as superior. His *Collected Hymns* were pub. in 1861, including 'O Gift of Gifts, O Grace of Faith,' and 'Paradise, O Paradise'; and his complete works in prose and verse in 1914. See J. E. Bowden, *The Life and Letters of Frederick William Faber*, 1869; G. Faber, *Oxford Apostles*, 1933.

Faber, Sir Geoffrey (1889-), publisher and author, b. Great Malvern. He was educ. at Rugby School and Christ Church, Oxford, elected a Fellow of All Souls, and called to the Bar. In 1925 he founded the firm of F. & Gwyer, which now operates successfully under the name of F. & F. Ltd. As president of the Publishers' Association (q.v.), 1939-41, F. organised the campaign which freed books from purchase tax; he was later the 2nd chairman of the National Book League (q.v.). His prin. writings include *Oxford Apostles*, 1933, and *Jowett*, 1957. He was knighted in 1954.

Faber, George Stanley (1773-1854), celebrated Anglican divine, uncle of F. W. Faber, b. Yorks. He graduated from Univ. College, Oxford, became fellow and tutor of Lincoln College, Oxford, 1793; Bampton lecturer, 1801; rector of Stockton-on-Tees, Durham, 1805, and of Long Newton, 1811. In 1832 F. became master of Sherburn Hospital. His greatest book is *The Origins of Pagan Idolatry*, 1816. Among his other works are: *Horae Mosaicæ*, 1801, *On the Mysteries of the Cabiri*, . . ., 1803, *View of the Prophecies Relating to Judah and Israel*, 1808, *Difficulties of Infidelity*, 1824, *Difficulties of Romanism*, 1826, *The Sacred Calendar of Prophecy*, 1828, *The Primitive Doctrine of Justification*, 1837, and *Eight Disquisitions upon the Prophetical Promises of a Mighty Deliverer*, 1845. See G. S. Faber's memoir in *Many Mansions in the House of the Father*, 1854.

Faber, or Fabri, Jacques (c. 1455-1536 or '37), Fr. humanist and precursor of Protestantism; properly, J. Lefèvre d'Étaples, latinised into J. Stapulensis; b. Étaples. Went early to Paris to study; in 1486 to Italy, where he remained sev. years. On his return, he propagated Aristotelian principles, by trans. and paraphrases. F. met an old pupil, Guillaume Bricconnet, who had become bishop of Lodève, and who accommodated him in the abbey of St Germain-des-Prés. He made a Fr. trans. of the N.T., and his

biblical commentaries aroused the antagonism of the Sorbonne. Removed to Meaux (of which Brignonnet had become bishop), he was protected by Francis I. Later accompanied Marguerite of Valois to Blois, where he finished a trans. of the Bible. In 1531, Marguerite removed him for greater safety to Nérac, where he d.

Faber, or Fabri, Johannes (1478-1541), Ger. theologian, b. Leutkirch, Swabia, his real name being Heigerlin. Studied theology and canon law at Tübingen and at Friburg im Breisgau, became doctor in canon law. In 1518 he was appointed vicar-general of the diocese of Constance. He was friendly with Erasmus, Melancthon, and Zwingli; but, when the breach came, he chose the orthodox side, and became known as the Hammer of the Heretics—from his work, *Malleus . . . in Haeresim Lutheranam* (Cologne), 1524. He was prominent in many disputations and in 1531 became bishop of Vienna, where he d.

Faber, John (Johan), the Elder (c. 1660-1721), Dutch mezzotint engraver and draughtsman, b. at The Hague. One of the first artists to work in mezzotint, he came to London about 1687, and d. at Bristol. His pen-portrait of 'Simon Episcopus' on vellum is in the Brit. Museum. Among his other chief works are 'Portraits of Founders of Colleges at Oxford and Cambridge' (begun 1712), 'The Heads of the Philosophers' (after Rubens), 'Humphrey Lloyd of Denbigh, Antiquary,' 1717, 'Dr Wallis, Mathematician' (after Kneller), and portraits of Bishops Aterbury and Hough, of John Caspar and Dr Sacheverell.

Faber, John, the Younger (1684-1756), see ENGRAVING.

Fabia Gens, one of the oldest and most distinguished patrician clans or houses of ant. Rome, probably of Sabine origin, claiming descent from Hercules and a daughter of the Arcadian Evander. It was one of the 2 gentes entrusted with the management of the 'Lupercalia' (Ovid, *Fasts*, ii. 375). Among its most famous members were:

Quintus Fabius Vibulanus, Rom. gen., consul in 484, 481, and 479. He espoused the cause of the plebeians; but as he was opposed by the patricians, he and his house, to the number of 300, quitted Rome, built a fortress on the Cremera, and began to wage war on the ter. of Veil. They were at length defeated by the Volentes (477 BC), when the whole gens perished, except one individual from whom all the later Fabii descended.

Quintus Fabius Maximus Illianus, a famous gen., consul 5 times between 322 and 295 BC. Twice dictator, he fought in the 2nd Samnite War, gaining victories (326, 322), and at Sentinum, over united Gauls and Samnites (295). (See Livy, viii., ix.)

Quintus Fabius Maximus (nick-named Verrucosus and Ovilula), known to fame as 'Cunctator' (delayer), described by Ennius as 'unus qui nobis cunctando restituit rem,' was repeatedly consul, censor, and dictator (221, 217 BC). As

consul (233) he conquered the Ligurians and was granted a triumph. In 217 he was appointed dictator and led the Rom. armies against Hannibal. His slow, defensive policy, known ever after as 'Fabian policy,' (cf. **FABIAN SOCIETY**), did not at first find favour with his contemporaries, but after the crushing defeat at Cannae (216), it was at once resumed. In 215 Maximus ravaged Campania, was consul for the 5th time (209), and recaptured Tarentum. He opposed Scipio's aggressive policy, and d. in 203 BC.

Quintus Fabius Pictor (b. c. 254 BC), 1st Rom. prose historian, the 'father of Latin history.' He served in the Gallic War (225), and in the Second Punic War, dying after 216. His works (written in Greek) were known as *Annals of F. Pictor*. Only fragments of his hist. (from the time of Aeneas to the Hannibalic war) survive.

Fabian Society, organisation founded in London in 1884 for the advancement of Socialism by democratic means. It was formed out of the 'Fellowship of the New Life,' an association started by the wandering Amer. philosopher Thomas Davidson with the object of reconstructing society 'in accordance with the highest moral possibilities.' The S.'s name was an allusion to the victorious policy of the Rom. gen. Fabius 'Cunctator,' the 'Delayer,' and indicated the S.'s intention to fulfil its aims gradually. Amongst its earliest members were George Bernard Shaw, Sidney Webb, Sydney Olivier, and Graham Wallis. The S. was put on the map by the pub. in 1889 of *Fabian Essays*, ed. by Shaw, and by its series of *Tracts* to which he and Sidney Webb were frequent contributors. It was instrumental in the formation of the Labour Representation Committee in 1900, out of which grew the Labour party, and remained active until 1914, claiming James Keir Hardie and H. G. Wells amongst its many distinguished members. By 1914 it had over 2500 members organised nationally, and about another 1000 organised in local societies throughout the U.K. In the 1920's and 30's the F. S. passed through a less active phase, although its popular autumn series of lectures remained a feature of the London political scene. Its summer schools, begun in 1907, also continued. Revival came in 1939 with amalgamation with the New F. Research Bureau, which had been formed 8 years earlier with Mr C. R. (later Lord) Atlee as chairman and Mr (later Prof.) G. D. H. Cole as honorary secretary. Since 1939 the F. S. has remained active and influential, both through its pubs. and its lectures, schools, and conferences. It has a Home Research Dept and International and Colonial Bureau, publishes 2 jouns., a monthly news-sheet, and regular pamphlets. In addition to the national organisation there are 80 local F. S.s. Forty-one F.s held gov. office after the 1945 General Election, sev. in the Cabinet. Total membership of the F. S. in 1957, both nationally and organised through local F. S.s, was over 4000, of

whom some 130 were members of Parliament. These included Mr Hugh Gait-skell, leader of the Labour party. Recent books pub. by the S. have included *New Fabian Essays*, 1952, ed. R. H. S. Crossman, M.P., and *Fabian International Essays*, 1957, ed. T. E. M. McKitterick and Kenneth Younger, M.P. London H.Q. are at 11 Dartmouth Street, S.W.1. See E. R. Pease, *The History of the Fabian Society*, 1926; G. D. H. Cole and Margaret Cole, *The Fabian Society Past and Present*, 1952; W. T. Rodgers and others, 70th anniversary number of *Fabian Journal*, 1954.

Fabiana, a genus of S. Amer. evergreen shrubs, family Solanaceae, about 20 species. *F. imbricata* and *F. violacea*, heath-like in habit and flowering, are grown in mild Brit. gardens.

Fabli, see FABIA GENS.

Fabius, **Planiades**, see FULGENTIUS.

Fable (Lat. *fabula*, tale), a short story in which the characters are usually animals, to which human actions and feelings are attributed; a moral is generally appended at the end, the teaching of the F. being eminently practical and making no pretence of high ideals. The F. has affinities with the proverb and, like it, is very widely disseminated. An early collection of F.s is the Sanskrit *Panchatantra* of the 3rd or 2nd cents. BC, from which sev. other F. collections are derived. But Greece appears to have the oldest tradition of F.s. Some are found in Herodotus, and their reputed composer Aesop (q.v.) was said to have come from Phrygia in the 6th cent. BC and to have been a slave in Samos. Two centuries later a collection of his F.s was made by Demetrius of Phalerum, but this has perished, and it was left to the Rom. writer Phaedrus (1st cent. BC) to preserve Aesop's work in a Lat. rendering which we still have. Phaedrus's work was in turn transmitted to the Middle Ages in a Lat. prose version by Romulus, made in the 10th cent. There was also a Gk collection made in the 2nd cent. by Babrius and put into Lat. in the 4th cent. by Avianus.

The F. was especially popular in France, where the *Roman de Renart*, a beast-epic of 30,000 lines, took shape in the 12th cent.; later this became popular all over Europe, part appearing in England as *Reynard the Fox*. France also produced the greatest of all modern writers of F.s in Jean de La Fontaine (1621-95), whose work shows great feeling, sly fun, and delicate humour. He had various Fr. successors, but in Germany G. E. Lessing (1729-81) led a reaction against his literary handling of the F. and advocated a return to the directness and simplicity of the Aesop tradition. Other notable writers of F.s were Tomás de Yriarte in Spain, Lorenzo Pignotti in Italy, and Ivan Kryloff in Russia. In Eng. literature the F. made an early appearance. Walter the Englishman (fl. 1177) versified the F.s of the Romulus collection, and a vol. of F.s was pub. by Caxton in 1484. In the same century collections of F.s

were written by Lydgate and Henryson, the work of the latter being much the more spirited and colourful. In 1692 Roger L'Estrange pub. a collection of some 500 prose F.s. Dryden's *Fables*, 1698, are a misnomer, for they are simply tales taken from Ovid, Boccaccio, and other writers. The most important Eng. writer of F.s was John Gay, whose *Fifty-one Fables in Verse*, 1727, became highly popular. Later pubs. in the tradition of the animal F. were the *Uncle Remus* stories of J. C. Harris (1848-1908) and Kipling's *Just So Stories*, 1902. G. Orwell's *Animal Farm*, 1945, is a political satire cast in the form of a F. See H. Taine, *La Fontaine et ses fables*, 1860; E. T. Murray, *Selected Fables*, 1920.

Fabliaux, group of entertaining compositions, in the form of tales in 8-syllable rhymed verse, numbering over 100, and forming a marked section of Fr. medieval literature. The word 'fabliau' is really a diminutive of 'fable.' A fabliau always had reference to some event and was usually satirical and comic in quality, and frequently coarse. F. seem to have existed as early as the 8th cent.; but all the early examples are lost. The oldest preserved appears to be *Richeu*, about 1156, and the most modern are those of Jean de Conde and Watrquet at the beginning of the 14th cent. See J. Bédier, *Les Fabliaux*, 5th ed. 1925.

Fabre, Jean Henri (1823-1915), Fr. entomologist, b. Sainte-Léone in Aveyron. In middle life was prof. at the Natural Philosophy College of Ajaccio and the Lycée of Avignon. He was an opponent of evolutionary theory. He retired in 1871 to Sérignan where he d. F. wrote some of the most fascinating books on insects ever produced. They are filled with acute observations on the life and death of the creatures and are of deep interest to laymen. They have been trans. into all modern languages. Among his works are *Life and Love of the Insect*, 1911, and *Social Life in the Insect World*, 1912.

Fabre d'Eglantine, Philippe François Nazaire (1755-94), Fr. dramatic poet, b. Carcassonne. In spite of the hostility of his many enemies, he was successful with his *Le Collatéral* and was thereby encouraged to follow it up with his *Philinte de Molière ou la Suite du Misanthrope*, 1791, which remains his masterpiece, *L'Intrigue épistolaire*, 1791, and *Les précepteurs*, 1800. In 1794 he was arrested by the Committee of Public Safety, and later guillotined, together with Danton. His plays are noteworthy for their lively situations and good characterisation. He is also the author of the popular song 'Il pleut, il pleut bergère.' See L. Jacob, *F. d'Eglantine, chef des fripons*, 1946.

Fabri, Jacques, see FABER, JACQUES.

Fabri, Johannes, see FABER, JOHANNES.

Fabriano, Francesco di Gentile Da (c. 1360-c. 1428), It. painter, b. Fabriano, and called after his bp. He belongs to the early Umbrian and Sienese schools, and painted chiefly in Florence, one of his

finest extant pictures being the 'Adoration of the Kings' painted for the church of the Holy Trinity in Florence. A 'Madonna with Saints,' now in Berlin Museum, belongs to the same period. In 1426 he executed paintings for Pope Martin V in the church of San Giovanni, Rome, but these, together with other works, have been destroyed. His pictures indicate, for the most part, a joyful and cheerful disposition, and he had a great love of splendour and rich colouring. F. belongs to the transition period of the 15th cent.

Fabriano, It. tn in the Marches (q.v.), 35 m. SW. of Ancona (q.v.), at the E. end of the Apennines (q.v.). It has anct walls and a splendid 14th cent. bishop's palace. Many of its buildings, including the cathedral, were damaged during the Second World War. There is an anct parchment and paper-making industry. Pop. (tn) 14,000, (com.) 27,600.

Fabricius, Caius, surnamed **Luscinus** (i.e. 'the one-eyed'), Rom. gen. and statesman, renowned as a model of incorruptibility; consul in 282 BC. He was the first member of the Fabrician gens to settle in Rome. After the defeat of the Romans by Pyrrhus in 280 at Heraclea, F. was sent to treat for ransom, and though Pyrrhus endeavoured to bribe him, all attempts were vain. During his 2nd consulship (278), F. was successful in negotiating terms of peace with Pyrrhus. He gained a series of victories over the Samnites, Lucanians, and Bruttians, and on his return to Rome received a triumph. In 276 F. was censor, and carried out with great vigour the old Rom. sumptuary laws.

Fabricius, or **Fabrizio**, **Girolamo** (1533-1619), It. anatomist and surgeon, b. Acquapendente and educ. at the univ. of Padua, where he later became prof. of anatomy and surgery. He was one of the greatest of all teachers of anatomy. Wm Harvey (q.v.), discoverer of the circulation of the blood, was one of his pupils. F.'s best work was in the field of embryology; he wrote *De formato foetu*, 1600 (reprinted with Eng. trans. 1942), and *De formatione ovi et pulli*, 1621. He described the valves of the veins, practised surgery, and invented many surgical instruments.

Fabricius, **Jan** (1871-), Dutch dramatist, b. Assen. He went to Batavia in 1892 and took up journalism, taught himself Eng., Fr., and German, and returned to Holland in 1902. After an unsuccessful venture with a tourist agency and a return to the Dutch East Indies he came back home in 1914 and made a great success as a dramatist. His works include *Met de handschoen getrouwd*, 1906, *Onder één dak*, 1914, *Nomni*, 1916, *Demon*, 1922, *Cesare als Gastheer in de Gevangenis*, 1927, *Mrs Jim*, 1938, and short stories *Kimpes of Java*, 1939. He lives in England.

Fabricius, Johannes Albertus (1688-1736), Ger. classical scholar and bibliographer, b. Leipzig. His great reputation is founded on his 2 literary synopses, the *Bibliothecae*. At different times of his life he studied both medicine and theology, and he is known among theologians for his

collections of apocryphal and pseud-epigraphical literature.

Fabrics, **Textile**, the name applied to those F. produced by weaving, knitting, bonding, or braiding fibres, and embracing the production from various raw materials of cotton, wool, silk, flax, hemp, jute, and synthetic materials of more recent origin (rayon, nylon, etc.), which provide remarkable variety of surface. The simplest form of T. F. is the primitive manuf. in which the threads cross at right angles, regularly passing over and under one another, and a great variety of goods can be made in this way. The checks and stripes in the Scottish clan tartans are thus produced, and the thick, corded effect obtained in materials of the *repp* nature. Still greater variety in cloth types has developed in association with the use of the newer synthetic materials. See **CLOTH MANUFACTURE AND FINISHING**. Historically, T. F. are of anct date. Homer and other early writers speak of the weaving of the Greeks, who used to work (principally in wool) designs and patterns of mythological subjects on their tapestries. The Egyptians also were celebrated from quite early times for their T. F.

The supply of raw material and the adaptability of the people to a manufacturing life are the chief influences which control the estab. of the T. industry in any particular country. The earliest forms of machinery used were the handloom and spinning wheel, and the manuf. of homespun from wool was one of the first of T. industries to spring up among the people. It has now secured a foothold in nearly all countries in which wool F. are required for clothing. The fabrication of cotton had its greatest growth from the development of the factory system in the U.K., but after the First and Second World Wars Japan and India had estab. large industries, and there is scarcely any industrial country without its own cotton industry to-day.

To China and Japan we owe our fine and beautiful F. of silks. The silkworm flourishes in these countries and labour is relatively cheap and plentiful. These nations (in normal pre-world-war years) produced F. of a costly and beautiful nature, which could not be equalled by the more highly industrialised nations; though the introduction of the silkworm into central and W. Europe caused a wonderful increase and advance in the manuf. of silks in France, Italy, Switzerland, Germany, and Austria. But in all these countries, as in the U.S.A., where the silk industry was developed in 1870, there was a sharp decline in silk manuf. following the rapid growth of the rayon and nylon industries between the First and Second World Wars. Throughout this period the growth of the T. industry was influenced by the rapid changes of fashion and the eagerness of the people to seize upon novelty.

T.s may be said to reflect the life of nations, and in the Victorian era people became insensitive to beauty in their

scramble for wealth; pattern and design were ignored, and there was a lack of taste and need for selection. Much is owed to Wm Morris (q.v.) and a few of his contemporaries for giving us, among other things, beautifully designed T.s. In the early 20th cent. there was a marked distaste for patterned T.s (with the exception of the Morris productions) and the 'Art Nouveau' evolved plain T.s, wall coverings prevailing. However, in 1911 Picasso and the first post-impressionists exhibited their work in London, and as a result colour and abstract design became the vogue. To an increasing extent distinctive painters were commissioned as designers, and the local art schools began to wield an influence hitherto unheard of. Throughout the first half of the 20th cent. the main emphasis was on texture and construction—with an ample variety of materials and processes available—and the results could be seen with equal pleasure in both traditional and contemporary styles. Although actual construction underwent little change there was rapid development in the performance of T. F. due to skilful blending of natural with synthetic fibres and new finishing processes. New treatments were introduced which gave F. distinct qualities, such as resistance to creasing, shrinking, and moisture. See R. Glazier, *History of Textile Fabrics*, 1923; Noel Carrington and Muriel Harris, *British Achievement in Design*, 1946; A. T. C. Robinson, *Rayon Fabric Construction*, 1951; A. J. Hall, *Standard Handbook of Textiles*, 1954; W. Watson, *Textile Design and Colour*, 1954.

Fabrizi, Nicola (1804–85), It. patriot, b. Modena. He was an ardent republican, and helped Crispi in the revolutions of 1848 and 1860. Landing at Pizzolo, he joined Garibaldi at Palermo, and was governor of Messina and minister of war under the Garibaldi dictatorship. In 1866 he was chief of staff to Garibaldi. His political aims were to secure the return of Crispi to power and to obtain agreement among the leaders of the Left.

Fabroni (Fabbioni), Angelo (1732–1803), famous It. biographer, sometimes called 'the Plutarch of modern Italy'. Educ. at Faenza and Rome, he was a Lat. scholar, and was appointed tutor to the sons of Leopold of Tuscany (1773). His chief work is *Vitae Italorum Doctrina excellentium qui Saeculis XVII et XVIII floruerunt* (20 vols.), 1778–1805. He also wrote *Laurentii Medicei Vita*, 1784, and *Vita Magni Cosimi Medicei*, 1788–9.

Facade (Fr., from the It. *facciata*, *faccia*, the face), front exterior of a building. It is generally used in referring to the front elevation of more important buildings of considerable magnitude, though the term is not necessarily restricted to these. The back elevation is spoken of as the 'rear' F., and the side as the 'lateral' F. The sides of a court are also called F.s, and distinguished as the E. or W. F.s, etc.

Facciolati, Iacopo (1682–1769), It. savant, b. Torreglia, near Padua. Prof.

of Logic in the univ. of Padua (from 1723). With the assistance of his pupil, Egidio Forcellini, he revised the *Calepinus septum linguarum*, pub. posthumously, 1772 (see CALEPINO), and began the compilation of the *Lexicon totius latinitatis* (see FORCELLINI). He also pub. *Ortografia italiana*, 1718, *Synagmata*, 1752, *Fasti*, 1757, as well as *Il giovane cittadino*, etc., 1740. Many of his beautiful Lat. orations were pub. in the Leipzig *Acta eruditorum*.

Fachinetti, Giovanni Antonio, see INNO-CENT (popes), Innocent IX.

Facia, see FASCIA.

Facility, in Scots law, a word applied to mental deficiency to differentiate it from idiocy. If a person voluntarily places himself and his property under the care of one or more trustees, the case is called one of *voluntary interdiction*. The persons so engaged are called interdictors, and a facile person may not transact business—or, if he does, it is null—without the consent of the interdictors. If the court of session appoint interdictors for a facile person, the case is called one of *judicial interdiction*. Even in cases where there has been no interdiction, a contract signed by a facile person is null if it can be proved that such a person was imposed upon contrary to his own interests.

Factor, mercantile agent employed to transact business for another. He is entrusted with the management and disposal of goods, his remuneration for which is called factorage or commission. Unlike a broker, a F. buys and sells in his own name. The first F. act was passed in 1825, in the reign of George IV. It enacted that a F. entrusted with the goods of another should be recognised as the legal owner of those goods, so far as to give validity to any contracts made by him with any persons dealing on the faith of that ownership. See COMMISSION.

Factor, in mathematics, any one of a group of numbers whose product is a given sum. Thus 2 and 3 are F.s of 6. In algebra it is often useful to be able to express the sum and difference of unlike terms as the product of F.s, e.g. $x^2 + 2xy + y^2 = (x+y)^2$, $x^2 + (a+b)x + ab = (x+a)(x+b)$, $x^2 - y^2 = (x+y)(x-y)$. The *F. theorem* states that if $f(x)$ is such that $f(a) = 0$, then $x-a$ is a F. of $f(x)$. This theorem enables the F.s of complicated binomials to be found by trial and error. **Factorial** n is written $n!$ or $\lfloor n$ and is the continued product of $n(n-1)(n-2) \dots 3 \times 2 \times 1$.

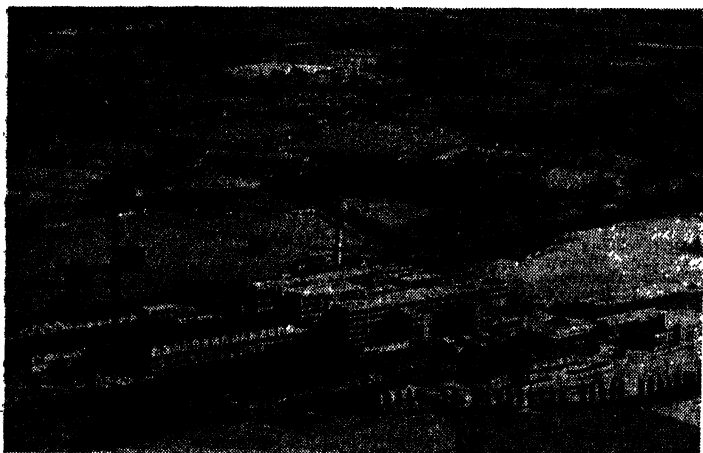
Factor, Judicial (from Lat. *facere*, to do), in Scotland, is an officer appointed by the court of session or sheriff court for the purpose of managing the assets heritable or movable of one who is for some cause or other incapable of managing them himself.

Factory Inspectors, see FACTORY LEGISLATION.

Factory Legislation in Great Britain. The F. and Workshop Acts (all of which were repealed and in part re-enacted in the Act of 1857, see below) have for their object the amelioration of the

conditions under which the various classes of workers conduct their operations. The foremost provisions of these Acts are those which regulate the sanitary or hygienic condition of the workplaces, and those which relate to the safety of workpeople, with especial reference to industrial injury, the limitation and control of working hrs, particularly of child workers, the protection of child labour, and the more efficient administration of the Acts by means of F. inspectors. In the middle of the 18th cent. the country still reposed on the ruins of the medieval hierarchy of classes, with its taint of serfdom and bondage. The rise

of tices. It was not until after the application of steam power to manuf. that the wholesale employment of children called for the Cotton Mills Act in 1819. This Act, which Robert Owen was partly instrumental in passing, limited the age at which children might work in F.s, and the time of their labour to 72 hrs per week. From that year to 1866 a series of Acts such as the Act of 1844, limiting the labour of children in calico print works to 6½ hrs a day, and Ashley's Act of 1845, forbidding night work to women, contained regulations respecting the safety, hrs, meal times, and holidays of children, young persons, and women.



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FACTORY AND SUNSHINE: SOMERDALE, BRISTOL

A modern factory for the manufacture of cocoa and chocolate

of the 19th cent. was slowly dissolving the ties of inborn status, but the movement from Status to Contract was only complete with the industrial revolution brought about by the almost synchronous invention of labour-saving devices by Arkwright, Crompton, and others. The view that with these came a new evil of bad working conditions has been challenged. The domestic workshop was replaced by the factory. Long hrs, poor conditions, woman and child labour, and other evils were common in the domestic system. But when workers were congregated in cotton mills and factories, public attention was drawn to these conditions and it was possible for the first time to bring them under public control by Act of Parliament.

The first piece of F. L. was the Morals and Health Act, 1802, which provided for the ventilation and cleansing of cotton mills and F.s, and for the clothing, hrs of labour, and religious education of appren-

tices. But so far L. only affected the textile and allied industries. The early Acts were almost totally deficient in provisions for enforcing the law, this matter being left entirely to the local magistracy. In 1833, however, the efforts of Lord Ashley were successful in securing the appointment of the first skilled inspectors.

From 1860 to 1864 Acts were passed to include in the existing F. L. a number of non-textile industries. The Act of 1864 was remarkable for a departure in two directions: (1) it included provisions that benefited all classes of labour irrespective of sex or age, e.g. by providing for more effective ventilation so as to remove injurious gases, dust, or other impurities; and (2) it assimilated its provisions in some respects to those of the Coal Mines Regulation Acts, by adopting the special rules system of these Acts, especially in regard to 'safety' precautions. By the combined operation of the Sanitary Act, 1866,

and the Workshops Regulation Act, 1867, local authorities were invested with powers of administration to secure the general sanitation not only of F.s but of all places where manual labour was employed in the manuf. or finishing of articles for sale.

The course of the L. up to the great Consolidating Act of 1878 was unscientific. Acts of Parliament were passed *ad hoc* to deal with evils only occasionally brought home by the inquiries of successive commissions or the representations of men

efficient application of the ordinary Public Health Acts to F.s and workshops by successive transference of powers from the F. inspectors to local sanitary authorities; (3) the development of provisions for securing a greater measure of safety against accidents, e.g. by the adequate fencing of machinery in F.s; (4) the development of the system of regulating by special requirements the conditions under which certain occupations scheduled by the Home Office as unhealthy and dangerous might be carried



FACTORIES AND SMOKE: A POTTERIES LANDSCAPE

The Times

From the tower of Hanley Parish Church, looking towards Burslem

like Robert Owen. Up to 1878 there were a score of more or less unrelated statutes with a mass of regulations framed by inspectors or others avowedly in pursuance of the provisions of these statutes. In 1878, however, the Consolidating Act appeared. Like all Consolidating Acts (q.v.) this Act made some changes; it increased the minimum age of child labour in textile F.s to 10; it made provision for holidays and pauses in the continuous hrs of the fixed working day. Into the detailed provisions of this Act it is not necessary to enter, because the additional L. of 1883, 1889, 1891, 1895, and 1897 soon led to a second Consolidating Act in 1901. The Acts from 1878 to 1895 were directed mainly to: (1) the development of a specialised hygiene in factory life; (2) the more

on; (5) the restriction of the employment of women shortly after childbirth; (6) control of overtime work; and (7) the reduction of the hrs of labour for children.

A striking feature in 1893 was the first appointment of women inspectors. Up to 1937 the only parts of the F. and Workshop Act which applied to men were those respecting sanitation and safety, such as cleanliness and ventilation, means of escape in case of an outbreak of fire, and fencing of machinery, and regulations in regard to dangerous trades. Greater stringency in these latter respects came in the F. and Workshop Act, 1895, and still more in the codifying Act of 1901. The departures of the Act of 1895 in the requirements as to the sanitary condition of premises in which outworkers were employed and the maintenance of a

proper temp. in workplaces of great humidity, and ann. returns of persons employed, the investigation of accidents, and the particulars of wages due to piece-workers, were strengthened in the Act of 1901. This repealed and re-enacted with new features all the pre-existing Acts. Notable additions were made in the direction of more efficient means for securing sanitation, and for ensuring safety in dangerous trades. The minimum age of child employees was raised to 12.

THE FACTORIES ACT, 1937, which consolidates and amends all former legislation, lays down general principles for the health, safety, and welfare of factory employees. The Minister of Labour (before 1946, the Home Secretary) is empowered to make regulations to meet the needs of particular industries and changing industrial processes. The Ministry's inspectors are responsible for inspecting factories, enforcing the Act, and prosecuting for any statutory offences. Parliament has intended that factory workers should be made aware of the law passed for their protection. It would be impracticable to exhibit copies of an Act having 160 sections and 4 schedules, but factory occupiers must display at prin. entrances to their premises in places where they can be conveniently read by employees a prescribed abstract of the Act, the names and addresses of the dist. inspector and the appointed factory doctor, and every other notice or document required by the Act. The statutory definition of 'factory' includes not only the popular meaning of this term, but also many varied types of premises such as shipyards, dry docks, gasholders having a storage capacity of not less than 5000 cub. ft, and certain building and civil engineering construction sites. This definition is important to an injured workman wishing to know whether he can sue his employer for a breach of the Act or must rely on an action for common law negligence (q.v.). The brevity compelled by an article of this length permits reference only to the more important matters dealt with by the Act.

Health.—Factories must be kept clean; accumulated dirt and refuse must be removed daily from floors, work benches, staircases and passages, and floors must be effectively cleaned at least once a week. Each employee must be allowed at least 400 cub. ft of space. Workrooms must be adequately ventilated and, so far as is practicable, all dust and noxious fumes must be rendered harmless. There must be a reasonable temp. in workrooms; where light sedentary work is performed, a temp. of at least 60° must be maintained after the first hr. A thermometer must be placed in a suitable position in each workroom. Every part of a factory in which persons work or pass must be adequately lit; the minister may prescribe particular standards of lighting but cannot insist on a particular illuminant. Employees must be provided with suitable and clean sanitary accommodation. The

requisite standards are prescribed by the minister and are enforceable by the dist. council. The Factories Act, 1948, empowers the minister to make regulations for medical supervision in factories where the health of workers is likely to be injured by any substance or material used there. An underground room may not be used as a factory if certified by an inspector as unsuitable. New underground rooms cannot be used as workrooms unless the inspector is first notified, and his written consent is required if the room is to be used for any process of a hot, wet, or dusty nature, or which is likely to give off fumes.

Safety.—The Act provides that dangerous machinery should be adequately fenced, and that every hoist and lift should be securely fenced, be of sound mechanical construction, of sound material and adequate strength, and be properly maintained. There are specific safety precautions to be observed in the use of certain materials and processes, e.g. where steam boilers, vessels containing dangerous liquids, gasholders, cranes and other lifting machinery, or explosive or inflammable substances are used in the course of work. Young persons must be properly trained and adequately supervised in the use of dangerous machinery. An employer's overall duty to provide his employees with safe access includes the proper construction and maintenance of stairs and passages, and security of ladders. Most factories must have a certificate from the dist. council that the fire escape is adequate 'having regard to the circumstances of the case.' If an inspector considers that the condition of a building is too dangerous to be used as a factory, he may apply to a magistrates' court for an order prohibiting its use for that purpose.

Welfare.—Factory employees must be provided with an adequate supply of drinking water, washing facilities, and accommodation for clothing not worn during working hrs. At least one first-aid box must be provided for each 150 workers. Employees must be given suitable seating accommodation if they can conveniently perform their work in a sitting position. The minister can make regulations for the welfare of factory workers on such matters as first aid and rest rooms, canteens, and the provision of protective clothing. Accidents must be recorded in an accident book kept at the factory and notified to the inspector.

Employment of Women and Young Persons.—The Act limits the maximum working week for young persons to 44 hrs, which, in certain industries, may be increased to 48 hrs if the minister is satisfied that this is not likely to be harmful to health. With these exceptions, the maximum hrs to be worked by women and young persons is 48 per week and 9 per day; the maximum daily 'period of employment' (i.e. the whole time from starting to finishing work) is 11 hrs, and there must be no work after 1.00 p.m. on Saturdays. Young persons under 16

may not work more than 48 hrs per week, but other young persons and women may work up to 100 hrs' overtime per year. The maximum permitted overtime worked by women and children over 16 may be increased in certain factories subject to seasonal or other special pressure. The minister may prohibit the overtime employment of young persons in any process if he is satisfied that it would prejudice their health. A young person being taken into employment must be affirmatively certified as fit for employment (i.e. not merely as not unfit). The Act also contains certain restrictions on the night employment of women and young persons. See J. Thompson and H. R. Rogers, *Redgrave's Factories, Truck, and Shop Acts*, 1952; W. M. Cooper, *Outlines of Industrial Law*, 1954; and H. Samuels, *Factory Law*, 1957.

Faculty: 1. A term formerly applied in philosophy to a fundamental function of the mind. Modern psychologists, however, regard the mind as a unity, not possessing F.s, but different activities.

2. In eccles. law, a F. is a dispensation or licence. *The Court of Faculties* is the court of the archbishop of Canterbury for granting certain dispensations, such as marrying without pub. of banns. Its chief officer is called the master of faculties, who is usually also the dean of arches (q.v.). *A Grant of Faculty by the Ordinary* is given by the consistory court of the bishop of the diocese, and is necessary in order to effect any alterations in or additions to a church or parsonage. See R. Phillimore, *Ecclesiastical Law*, 1895.

3. The word is also applied to a branch of learning. In this sense it is derived from Lat. *facultas*, which was used in medieval times to translate Gk *dunamis*. Thus, the F.s of medieval univs. were art, theology, medicine, and law. This use has since been further extended to include the body of members of a profession. Thus, in Scotland, certain groups of profs. are called 'faculties.'

Fadden, Sir Arthur William (1895-), Australian statesman, b. Ingham, Queensland, member of the House of Representatives from 1936, deputy leader and acting leader of the Australian Country Party from Nov. 1940. He held various ministerial offices in the Liberal-Country Party gov. 1940-1, was prime minister Aug.-Oct. 1941, and leader of the federal opposition 1941-3. He was a member of the advisory war council, 1940-5. In 1949 he became Commonwealth Treasurer and deputy prime minister in a Liberal-Country Party coalition. He was appointed a privy councillor, 1942, created K.C.M.G., 1951, and G.C.M.G., 1958.

Fadeyev (real name *Bulyga*), **Aleksandr Aleksandrovich** (1901-56), Russian novelist, an outstanding representative of the group of proletarian writers, much influenced by L. Tolstoy—particularly his psychological realism. F.'s 2 best books are *The Rout*, 1927, about Siberian Red guerrillas during the Civil war, and *The Young Guard*, 1945, about a resistance group of young patriots behind the Ger.

lines in the Donets Basin (see **YOUNG GUARD**). A Communist party member since 1918 and a member of the party's central committee, F. strongly influenced the development of Soviet literature; from 1946 to 1955 he was general secretary of the Soviet Writers' Union. He took a prominent part in the post-war campaign led by Zhdanov in the name of 'socialist realism' against all traces of freedom and realism in literature. He was himself attacked in 1947 for having failed to show, in *The Young Guard*, the leading role of the party, and was forced to produce a revised version in 1951. In the last years of his life F. became an alcoholic, and he finally shot himself.

Fading, decrease or fluctuation of intensity in output of radio receivers, usually due to variations in the rate of decrease of the index of refraction with height in the atmosphere, which cause variations in the bending of the trajectory of radio waves towards the earth. It is particularly noticeable at a distance from the transmitter when the surface wave and the sky wave are of about the same intensity and their fluctuating phase difference causes distortion as well as decrease in signal strength.

Faed, John (1819-1902), painter, son of a millwright, b. Kirkcudbright; was elected an A.R.S.A. in 1847 and R.S.A. in 1851; his paintings, such as 'The Cottar's Saturday Night,' are genre studies of humble Scottish life.

Faed, Thomas (1826-1900), painter, brother of John F., b. Burley Mill. He studied at the Edinburgh School of Design, and is best known as a painter of domestic genre, his pictures of this kind being 'Reading the Bible,' 'Mitherless Bairn,' etc. Consult W. D. McKay, *The Scottish School of Painting*, 1906.

Faenza (anc't *Faventia*), lt. tn, in Emilia-Romagna (q.v.), on the Lamone, 18 m. SW. of Ravenna (q.v.). It has 15th-cent. ramparts, a 15th-cent. cathedral (never completed), an arcaded market place, and anc't palaces. It has been famous since medieval times for its majolica ware (see **FAIENCE**), and it has a school of ceramics. The International Museum of Ceramics suffered severely (along with other buildings) during the Second World War, and many of its specimens were destroyed; these have, to a large extent, been replaced. The tn also has textile, furniture, iron-ware, and sulphur industries. Pop. (tn) 15,200, (com.) 48,000.

Faerøe Islands (Dan. *Færøerne*, sheep is.), group of self-governing Dan. is., situated in the N. Atlantic between the Shetland Is. and Iceland, 200 m. NW. of the former. They number 22, of which 18 are inhabited. They almost all present a steep and precipitous coast seaward, the cliffs being 1000 to 2000 ft high. The harbours do not afford a very safe anchorage, but they are washed by warm currents, and are always free from ice; the currents which run through the sounds are swift and dangerous, and storms and whirlwinds are very frequent. The

surface is almost everywhere hilly, attaining the height of 2502 ft in Strøme and 2756 ft in Østere. All timber for building purposes is imported from Norway, as there are no trees in the is., but the rocks are covered with moss and ferns and the soil is rich in peat and coal. There is little cultivable soil, and only hay and potatoes can profitably be produced. The inhab. rely chiefly on the sea for their animal food. The ann. massacre of whales, schools of which are driven into the harbour of Thorshaven and there slaughtered, is an important event. The chief sources of wealth are fish (both fresh

started in opposition to the Unionist party. Home rule was granted in 1948. Total area 540 sq. m.; pop. 31,780.

Faesi, K. Robert (1883-), Swiss poet and playwright, b. Zürich. He was prof. of Ger. literature in Zürich Univ. from 1922 to 1953. He is one of the few successful dramatists that Switzerland has produced. His tragedy *Odyseus und Nausikaa*, 1911, his drama *Opferspiel*, 1925, and his comedies *Die offenen Türen* and *Die Fassade*, 1918, are of a quality unusual in the Swiss theatre. As literary historian he has written on A. E. Fröhlich, Paul Ernst, Carl Spitteler, Rainer



FAEROE ISLANDS: KVIVIK

Royal Danish Embassy

and dried), fish oil, skins, wool, and sea-bird feathers (especially loons). The largest is. are Strøme, Østere, Vaaga, Sande and Sudere. The cap. and chief port of the group is Thorshaven in Strøme; Kirkebe on the same is. was formerly the seat of a bishop. The inhab. are almost exclusively of Norwegian descent, and speak an old Norse dialect, although up to 1948 Dan. was the only language used in the law courts, churches, and schools. Their religion is Lutheran. The F. I. were first colonised in the 9th cent., and belonged to Norway until 1380, when they passed to Denmark. After the seizure of Denmark by the Germans in April 1940, Brit. troops occupied the F. I., but it was announced that they would be given back to Denmark after the war. In Sept. 1946 the people of the F. I. voted in favour of the is. separating from Denmark, and becoming a rep. The plebiscite was the culmination of a struggle dating from 1906 when a Home Rule party was

Maria Rilke, and C. F. Meyer; also *Gestalten und Wandlungen der Schweizer Dichtung*, 1922. In 1928 he received the Swiss Schiller Prize for his collection of poems, *Der brennende Busch*. Other poems, *Aus der Brandung*, 1917, were inspired by the First World War. He was awarded the Zürich *Literaturpreis* in 1946.

Faerolae, see FIESOLE.

Fagan, James Bernard (1873-1933), Brit. dramatist. Educ. at Oxford, he became an actor in the companies of Frank Benson and Herbert Tree. His first play was *The Rebel*, 1899; others were *The Prayer of the Sword*, 1904, *Under Which King*, 1905, and *The Earth*, 1909, but his most successful was *And So To Bed*, 1926, with Peppys the diarist as chief character.

Fagging, a system prevalent in Eng. public schools by which a junior boy performs certain duties for a senior, such as running errands, stopping balls at cricket, tidying his study. The system was fully estab. at Eton and Winchester during the

16th cent.; it usually has the full approval of the authorities. The arguments in its favour are that it gives a certain amount of autonomy to the boys, and that it prevents bullying. It tends to make the younger boys helpful and willing, and devolves responsibility upon the elder boys, who are accountable for the good conduct of their fags and must protect them against bullying. A similar system known as *Fennalism* was introduced into the Ger. univs. during the 17th cent., and is estab. in Amer. colleges, where it is known as *hazing*.

Fagopyrum, see BUCKWHEAT.

Faguet, Emile (1847-1916), Fr. critic and essayist, b. La Roche-sur-Yon. He was a master in schools at La Rochelle and Bordeaux; in 1897 he became a prof. at the univ. of Paris, and was appointed a member of the Fr. Academy in 1900. He was dramatic critic to the *Soleil* and literary critic to the *Revue bleue*, and one of the most famous critics of his time. Among his works are: *Histoire de la littérature française depuis le XVII^e siècle jusqu'à nos jours*, 1900-1; and monographs on Voltaire, 1895, Flaubert, 1899, Zola, 1903; *Propos de théâtre*, 1903-10, and *Histoire de la poésie française de la Renaissance au Romantisme*, 1923-34. See A. Sché, *Emile Faguet*, 1904; also A. Bells, *La Critique à la fin du XIX^e siècle*, 1926.

Fagus, genus of Fagaceae, 10 species of deciduous trees, of which *F. sylvatica* is the beech native to Britain; *F. grandiflora*, Amer. beech; *F. japonica*, Jap. beech; and *F. engleriana*, *F. longipetiolata*, and *F. lucida* are Chinese beeches. *F. orientalis*, E. Europe, is the largest-leaved beech.

Fahlore, grey copper ore of 2 varieties, *arsenical* and *antimonial*. The former occurs crystallised and massive, and consists chiefly of arsenic, copper, iron, and sulphur. The latter occurs crystallised in modified tetrahedrons, and consists chiefly of antimony, copper, iron, sulphur, and zinc.

Fahlun, see FALUN.

Fahlunite, or *Trieklasite*, hydrous silicate of aluminium and iron, being an alteration product of the mineral *iolite*, due chiefly to its hydration. It usually occurs in regular hexagonal prisms, though its primary form is a right rhombic prism. Its colour is yellowish, greenish, and blackish-brown.

Fahrenheit, Gabriel Daniel (1686-1736), Ger. physicist, b. Danzig. He lived in England and Holland, studying physics and the manuf. of meteorological instruments. He introduced certain improvements in the construction of thermometers, notably the use of mercury. He divided the interval between the temp. of a mixture of ice and salt and normal body temps. into 96 parts, the present F. scale, freezing point 32°, boiling point 212°, being a later modification. He was elected F.R.S., London, 1724, and contributed papers to the *Philosophical Transactions*. See METROLOGY.

Fahrenheit Thermometer, a T. named after its inventor, Gabriel Daniel F. (q.v.), in which mercury is used instead of alcohol. It can measure higher temps. than alcohol; up to 570° C. If the upper part of the stem is filled with nitrogen under pressure. See THERMOMETER.

Faidherbe, Louis Léon César (1818-89), Fr. gen., b. Lille. In 1852 he went to Senegal, of which he was appointed governor. The work he accomplished in Fr. West Africa, culminating in his defeat of El-Hadj Omar, is his best memorial. When he d. he had just put the finishing touches to his book *Le Sénégal: La France dans l'Afrique Occidentale*. It is through Senegal that France plays a decisive part, political and moral, in West Africa, and it was F.'s colonisation that really led to control over a vast continent. In the Franco-Ger. War he commanded the N. Army. He withstood the attack near the R. Hallue, but was severely beaten at St Quentin in 1871. When peace was signed F. was sent by the Fr. Gov. to Egypt to study the monuments and inscriptions. His archaeological works include *Collection des inscriptions numidiques*, 1870, *Epigraphie phénicienne*, 1873, *Essai sur la langue poul*, 1875. See lives by Fulcrand, 1890, by I. M. Brunel, 1897, and Villard, and also 'Faidherbe,' by Robert Delavignette, in *Les Techniciens de la Colonisation* (ed. C. Julien), 1946.

Faidit, Gaucelm (c. 1160-c. 1215), Provençal troubadour, b. Uzerche, Limousin. He was at first a *jongleur*, and wandered about with his wife, Guilhelma Monja, to the different European courts. In 1202 he accompanied Boniface III of Montserrat to the crusades. Sev. of his songs are exhortations to the young and the strong to take part in the Holy War. Among his masters were Richard Coeur de Lion (whose death he lamented in a beautiful *planh*), Raymond d'Agout, and Geoffrey of Brittany. Sev. songs and fragments of love lyrics are extant and are of great beauty. See R. Meyer, *Das Leben des Troubadours G. Faidit*, 1876.

Faience, name given on the Continent to tin-glazed earthenware; a Fr. word derived from the It. tn. Faenza, famed for its Maiolica (q.v.). In England F. has the same meaning as Delftware (q.v.). For its hist., see EARTHENWARE, *European*. See A. Lane, *French Faience*, 1948.

Faifo (Phai-phô), port in the prov. of Quang-nam, Annam, standing on the N. bank of a riv., 5 m. from the sea. To-day F. is a tn. of 10,000 inhab., engaging in the export of local products (sugar, tea, silk, etc.). During the 17th cent. it was the centre of trade between Cochín-China and Japan, and had a considerable Jap. merchant community. European ships also called to trade, and there was a Christian mission.

Fallsworth, tn. of Lancs, England, 4 m. NE. of Manchester. Its chief industry is cotton manuf. Pop. 18,540 (1954).

Fain, Agathon Jean François, Baron (1778-1837), Fr. historian, and secretary to Napoleon I, b. Paris. He was a member of the Committee of Public Safety

during the Revolution, and later held office under the Directory and the Consulate. He became archivist and secretary to Napoleon, whom he accompanied on all his campaigns; until the emperor's abdication in 1814. In 1830 Louis Philippe made him first secretary of the cabinet. His works on the military and diplomatic events of his time are valuable for their accuracy, the years 1812-14 being particularly well covered.

Fainéants, Rois, the 'Do-nothing Kings,' nickname of the later Merovingians of France, namely Thierry III, Clovis III, Childobert III, Dagobert III, Childeric II, Thierry IV, and Childeric III. They were so called because during their reigns the rule of the country virtually lay in the hands of the mayors of the palace.

Fainting, or **Syncope**, sudden loss of sensibility due to arrested circulation. The term is particularly applied to minor cases of shock where the condition of insensibility is transitory. The observable symptoms of F. are a sudden pallor of the face and loss of control over the muscles. The patient falls more or less suddenly and remains inert without any movement whatever. The eyes are half-closed or shut, the limbs are limp, the pulse is very weak or disappears altogether. It may distinguished from epilepsy by the lack of movement and from catalepsy by the characteristic pallor. A feeling of faintness may not proceed as far as collapse; the patient feels dizzy, staggers for a moment, and suddenly recovers. The immediate cause of F. is an insufficient supply of blood in the brain. This may be brought about by actual loss of blood due to injury, or by poverty of blood due to a weakened condition, or may be preceded by a nervous disturbance. When F. is due to mental emotion, the medulla oblongata is over-stimulated to a condition of partial paralysis; the respiratory functions are sluggishly performed, the heart contracts feebly, and the circulation fails.

Treatment.—When assailed by a feeling of faintness, the patient should sit down and press the head downwards between the knees, when the flow of blood to the brain should be re-established. If the patient has already collapsed, he should be laid down with the head as low as possible and the respiratory functions stimulated by cold water on the face, by pungent aromatic vapours in the nostrils, etc.

Fair (Lat. *feriae*, holidays), large market, held periodically. A F. was usually held on a holiday or a saint's feast to take advantage of the concourse of people. According to Cicero, the Greeks utilised the religious games for trading purposes; and the Romans, too, traded during the ann. feast at the temple of Voltumna in Etruria. During the reign of Edward I of England it was felt that the churchyards or immediate precincts of the churches and abbays were being desecrated by F.s, and a law, embodied in the Statute of Winton, was passed to check the custom of holding F.s near a place of worship. Courts of summary jurisdiction

were formed to deal with any disputes or questions that might arise during a F., the date and duration of which had to be publicly made known beforehand. The traders who managed the F. were usually itinerant merchants, who went from place to place with their wares. At the time when means of communication were few, the F. was of great importance, but with new methods of transport it has almost passed away. St Bartholomew F. was held in London at Smithfield till 1855. Other famous F.s were Stourbridge F. near Cambridge, which lasted for 3 weeks, Glasgow F., and Greenwich F. In England the F. has in many cases developed into a market for livestock. One of the largest horse F.s is held annually at Horn-castle, in Lincs; Exeter has a F. in Dec. for horses and cattle; Ipswich has one for lambs in Aug.; and Nottingham has an Oct. goose F. Some F.s, such as that of Gloucester, are famous for the agric. produce sold. In some country tns, such as Witney, the old-fashioned F. still remains.

In Ireland the famous and commercially important 'Puck Fair and Pattern,' which lasts 3 days, is held annually in Killorglin (q.v.) during the 2nd week in Aug. and attracts thousands of visitors. On the evening of the first or 'Gathering Day' a 'puck goat,' usually a magnificent animal, is 'crowned' and, enclosed in a spacious cage, is enthroned on the top floor of a 3-tiered platform some 40 ft high, which is erected in the town square. Here for the next 2 days (i.e. 'Puck Fair Day' and 'Scattering Day'), catered for by watchful attendants, he presides over a great cattle, sheep, and horse F. as well as the huge throng of people engaging in commerce or amusing themselves at side-shows of every conceivable kind. Shops and business premises are kept open day and night during the 3 days. Some hold that the custom of enthroning a goat is a survival from pagan times, but local tradition has it that 'Puck' commemorates an occasion when the stampeding of herds of mt goats gave warning of the approach of Eng. forces.

F.s are still common on the Continent. Leipzig, before World War II, had 3 ann. F.s, each lasting 3 weeks, where leather, cloth, and furs were the chief commodities sold. Other F.s of note were those of Frankfurt-on-Main and Frankfurt-on-the-Oder, Beaucaille in France, Bergamo in Italy, Debreczen in Hungary, and Corky in Russia. Siberia had F.s at Kiashta and Irbit, and Arabia at Mecca. The F. has many points of similarity with the *mela* of India. See H. Morley, *History of the Fair of St Bartholomew*, 1859; C. Walford, *Fairs, Past and Present*, 1883; and *The Law relating to Markets and Fairs*, by Pease and Chitty, 1899. This term in the U.S.A. applies now solely to industrial exhibitions and what are known in England as fancy bazaars. In the former are included the 'state' and 'county fairs,' one of the first of which was the New York World's Fair opened in 1853 by a company formed in 1851. See also EXHIBITIONS.

Fair Isle, small isolated is. of the Shetlands (q.v.), Scotland, situated between that group and the Orkneys (q.v.), 24 m. SW. of Sumburgh Head, area 6 sq. m. Its sandstone cliffs are high and rocky, and it has an extremely indented coastline. Prin. industries are fishing and the production of knitted goods with characteristic intricate patterns in many colours. The patterns of the hosiery and other garments seem to be Moorish and may have reached the is. through the wrecked crew of one of the Armada vessels in 1588. Some copper is found. The is. has a bird-watching station for research into the origins, routes, wintering areas, feeding habits, etc., of spring and autumn migrators. Pop. 100.

Fair Maid of Kent (1328-85), Joan, daughter of Edmund, earl of Kent, granddaughter of Edward I; so called on account of her beauty. Her marriage to the earl of Salisbury was declared null, and in 1361 she married the Black Prince (q.v.) and was the mother of Richard II (q.v.). She is said to have mediated between her son and John of Gaunt (1385).

Fair Maid of Norway (1283-90), titular queen of Scotland. She was Margaret, daughter of Eric II of Norway, and granddaughter of Alexander III of Scotland, and she d. on her way from Christiania to succeed Alexander on the Scottish throne.

Fair Oaks, or Seven Pines, railway station of Virginia, U.S.A., situated 7 m. E. of Richmond. It is noted as the scene of a battle of the Civil war in 1862, when the Union forces under McClellan gained a victory over the Confederates under Johnston. The former lost 5031 men, while the latter lost 6134.

Fair Rosamond, see CLIFFORD.

Fairbairn, Andrew Martin (1838-1912), theologian, b. near Edinburgh, and educ. at Edinburgh and Berlin Univs. In 1877 he was appointed principal of the Airedale Congregational College, Bradford, a post which he gave up in 1886 on receiving a similar appointment at Mansfield College, Oxford. Author of *Studies in the Philosophy of Religion and History*, 1876, *Studies in the Life of Christ*, 1881, *Christianity in the First and Nineteenth Centuries*, 1883, *The City of God*, 1883, *Religion in History and in Modern Life*, 1884, *Christ in Modern Theology*, 1893, *Philosophy of the Christian Religion*, 1902, and *Studies in Religion and Theology*, 1909.

Fairbairn, Sir William (1798-1874), Scottish civil engineer, b. Kelso, Roxburghshire. In 1804 he began his apprenticeship at the Percy Main Colliery, North Shields, where he became a friend of George Stephenson. In 1817 he began a business of his own in Manchester, entering into a partnership with James Lillie, which lasted till 1832. He introduced improvements in mill works and water wheels, substituting iron for wood in the shafting. He was one of the first to build iron ships, which he floated on the Forth and Clyde Canal. In 1835 he estab. shipbuilding works at Millwall, London, and was consulted by the Brit.

Association on the supposed defects in iron caused by hot-blast furnaces. He carried out the construction of the tubular bridge across the Menai Straits, designed by Robert Stephenson, and himself invented the rectangular structures of the Britannia and Conway bridges. He wrote extensively on engineering subjects. See *Lives by W. Pole*, 1877, and S. Smiles (in *Lives of the Engineers*), 1861.

Fairbanks, Douglas (1883-1939), Amer. cinema actor (real name Douglas Ullman), b. Denver, Colorado. He was educ. at Jarvis Military Academy, Denver, E. Denver High School, Colorado School of Mines, and Harvard Univ. He then took to the stage, under the tragedian Frederick Warde—his first part being François the lackey in *Richelieu*. After a period of Shakespeare, in whose plays F. did not shine, he joined the company of Herbert Keiley and Effie Shannon. He next became a clerk in a broker's office in Wall Street. After that he and 2 acquaintances went as 'hay-stewards' in a cattle-boat to Liverpool—tramped through England, France, and Belgium, working at odd jobs, for 3 months—then returned to America. For a little while F. was in a machine-shop; next, rambling in Cuba and Yucatan. When he returned to the U.S.A. he took up acting again. His first appearance on the New York stage was in 1901. He starred in *Man of the Hour* and *The Gentleman from Mississippi*. Married Anna Beth Sully, of Providence, Rhode Is., in 1907. After 1915 he confined himself to films, which included *The Half-Breed*, *The Habit of Happiness*, *The Good Bad Man*, *Reggie Mixes In*, *The Mystery of the Leaping Fish*, and *Manhattan Madness*. In 1917 he owned his own producing company. His outstanding pictures include *The Mark of Zorro*, *The Three Musketeers*, *Robin Hood*, *The Thief of Bagdad*, *Don Q.* and *The Black Pirate*. Divorced, 1918. Married, secondly, 28 Mar. 1920, the film-actress Mary Pickford (who obtained a divorce, 1935); third, Lady (Sybil) Ashley.

Fairfax, Edward (1580-1635), translator, b. Denton, Yorks, son of Sir Thomas F. His trans. of Tasso's *Gerusalemme Liberata*, pub. in 1600 with the title *Godfrey of Bullioigne, or the Recoverie of Jerusalem*, is one of the few trans. which themselves are literature, and was highly praised by Dryden and Waller. F. also wrote *A Discourse of Witchcraft*, 1621, and number of eulogues. See W. George, *Daemonologia*, 1882.

Fairfax, Sir Henry (1837-1900), adm. He distinguished himself as a lieutenant on the *Ariel* in suppressing the slave traffic off the E. coast of Africa, and in 1872 acted as naval attaché to Sir Bartle Frere in an expedition to the sultan of Zanzibar. In 1877 he was appointed to the command of the *Britannia*, when he personally superintended the studies of Prince Albert Victor and Prince George (afterwards George V). He was in command of the *Monarch* at the bombardment of Alexandria, 1882.

Fairfax, Thomas, 3rd Baron Fairfax of Cameron (1812-71), soldier, son of Ferdinando, 2nd Lord F. (q.v.), b. Denton, Yorks, and educ. at St John's College, Cambridge. He fought in the siege of Bois-de-duc (1829), and later in the 1st Scottish war, but it is as a parl. gen. during the Civil war that he is best remembered. He captured Leeds and Wakefield in 1843, and in the following year had a command at Marston Moor. In 1845 he was appointed commander-in-chief of the parl. army, and in that year defeated Charles I at Naseby. He was appointed one of the king's judges in 1849, but refused to sit at the trial, and, as a Presbyterian, was bitterly opposed to Charles's execution. In 1850 he retired from public life, but headed the commission to invite Charles II to return to England, 1860. See life by C. R. Markham, 1870.

Fairfax of Cameron, Ferdinando, 2nd Baron (1584-1648), soldier, son of Thomas F., 1st baron, of Denton, Yorks. His name is associated chiefly with the Civil war conflict in Yorks. When Charles I established his quarters at York, the Commons sent F. to report on the king's movements, and F., by protesting against the presentment of the grand jury of Yorks, received the thanks of parliament. He commanded the parl. forces in Yorks, but was severely defeated at Adwalton Moor.

Fairfield: 1. City of Jefferson co., Alabama, U.S.A., 5 m. W. of Birmingham, an industrial suburb of Birmingham founded in 1910 to provide for the employees of the U.S.A. Steel Corporation. Pop. 13,200.

2. City of SE. Iowa, U.S.A., with important manufs., the site of Parson's College (Presbyterian). An ann. Chautauqua assembly is held here. Pop. 8700.

Fairford, vil. of Gloucestershire, England, on the Colne at the foot of the Cotswold Hills, 9 m. E. of Cirencester. It is noted for its old church in the Perpendicular style, built by John Tame in the 15th cent. It has fine stained-glass windows of Flem. workmanship. See J. G. Joyce, *The Fairford Windows*, 1872. Pop. 1880.

Fairhead, or Benmore Head, promontory on the N. coast of Ireland, co. Antrim, 5 m. NE. of Ballycastle. It is of columnar basaltic rock, 636 ft. high.

Fairies and Elves (Fr. *fée*; Low Lat. *fata*, from *fatere*, to enchant; Lat. *fatum*, fate; O.E. *elf*; Icelandic *álfir*), supernatural beings existing in the mythology and folklore of all nations. They have often been represented as tiny, winged sprites, sometimes malignant, sometimes benign, who possess a mysterious power over human destinies. They need not, however, be diminutive beings, and have often appeared in the shape of humans. The F. of Teutonic and Celtic lore probably owe much to the sirens, nymphs, and fauns of classical mythology.

They have often taken the form of beautiful women who have beguiled men by their charms. Such were the Sicilian

Sirens, whose singing on the rock near Cape Pelorus had a fatal attraction for all seafarers until Ulysses, by an artifice, sailed safely past them, and they then drowned themselves in the sea. There are fairy lemans in Homer, elf-maids in Scandinavian literature, and R. L. Stevenson, in *Island Nights' Entertainments*, says that they are not uncommon in Samoa. F. are soulless beings, but by marriage with a man may attain immortality. When F. have left their own country to marry and live with men, they have generally been bound by some restriction, which, when disregarded, brings great misery. An example is in the story of Melusina (q.v.). According to another superstition, F. have to pay a yearly tribute to the powers of hell, and for this purpose they are always trying to steal little children, leaving changelings in their place. Moreover adults, too, have sometimes been lured to fairyland, and can seldom return from that country. A human being is doomed if he eats fairy food, and Falstaff, it will be remembered, dared not speak to F. or be a witness of their deeds: 'He that speaks to them shall die; I'll wink and couch: no man their works must eye.' F. can be very malicious—Falstaff was pinched by his friends disguised as F. and hobgoblins. There have always been good and bad F. As in the old nursery fairy tale of the *Sleeping Beauty*, so at the birth of Ogier le Danois (q.v.) 6 F. were present, 5 of whom gave good gifts, but the 6th was a bad fairy. In England, the fairy has been, in general, a domestic spirit, who visits houses at nights, sweeps the floor, threshes the corn, or skims the milk. Considerable interest has been aroused of late years in Celtic fairy legends through the writings of Andrew Lang, W. B. Yeats, Ernest Rhys, and others. Irish F. dwell in crevasses and underneath old tumuli, in some ways the Irish leprechaun thus resembling the black earth E. of Scandinavia, who burrowed underground dwellings, where they retreated with stolen treasure. Scottish F., brownies, kelpies, and the like, are supposed to be more malignant than their Irish brethren, and are creatures of storms and tempests.

Consult L. F. Maury, *Les Fées du Moyen Age*, 1843; T. Keightley, *Fairy Mythology*, 1850 (new ed. 1910); W. Sikes, *British Goblins*, 1879; J. Grimm, *Deutsche Mythologie* (Eng. trans.), 1880-1888; T. Goker, *Fairy Legends of Ireland*, 1882; W. B. Yeats, *Celtic Twilight*, 1883, 1902; and *Fairy and Folk Tales of the Irish Peasantry*, 1888; W. Craigie, *Scandinavian Folk-lore*, 1896; Sir J. Rhys, *Celtic Folk-lore*, 1901; R. Hunt, *Popular Romances of the West of England*, 1923; G. Willoughby-Meads, *Chinese Ghouls and Goblins*, 1928; M. W. Latham, *Elizabethan Fairies*, 1930; J. MacCulloch, *Were Fairies an Earlier Race of Men?*, 1932; L. Spence, *The Minor Tradition of British Mythology*, 1948.

Fairless, Michael, pseudonym of Margaret Fairless Barber (1869-1901), essayist, b. Castle Hill, Rastrick, Yorks. For

some time she worked as a nurse in a London alum, but an affection of the spine rendered her a semi-invalid living in a country cottage, where she occupied her time with writing reflective essays. *The Roadmender*, which she completed on her deathbed, had a great vogue in the early years of the century. The best-known of her other books are *The Gathering of Brother Hilarius*, 1901, and *The Grey Brethren*, 1905. Her *Complete Works* were pub. in 1932. See W. S. Palmer and A. M. Haggard, *Michael Fairless: Her Life and Writings*.

Fairlie, vil. of N. Ayrshire, Scotland, situated on the E. shore of the Firth of Clyde, 2½ m. from Largs. It is noted for yacht-building. Pop. 1400.

Fairmont, tn of W. Virginia, U.S.A., and the cap. of Marion co. It is situated on the Monongahela, 55 m. SE. of Wheeling, at an important railway junction. It ships great quantities of coal and manufs. glass, textiles, aluminium, mining machinery, fibre board, coke, chemicals, and clay and tobacco products. Pop. 29,346.

Fairy Rings, bare or green circles in pastures or meadow lands which were once thought to be the scene of the midnight revels of fairies. However, a scientific explanation of the phenomenon is that the rings are caused by the growth of the subterranean mycelium of fungi, which radiates outward to find fresh soil and nourishment. The circles are bare because the *Agaricus campestris* (common mushroom), or *Marasmius oreades* (the F. R. champignon), has exhausted the fertility of the earth, so that grass cannot grow, but as soon as the fungi begin to decay the ground becomes refertilised by the rich nitrogenous products of putrefaction and the grass grows greener than ever.

Fairy Tale, see CHILDREN'S BOOKS.

Faisal, king of Iraq, see Faisal.

Faisans, *Île des*, or *Île de la Conférence*, is. in the Biscayas (q.v.) on the frontier between France and Spain. Here was concluded the Peace of the Pyrenees (q.v.).

Faith is one of the 3 Theological Virtues (as they are called) of which 1 Cor. xiii. speaks, and the first in order of necessity (though not of importance). Jesus Christ insisted on F. in those who sought his help; and Heb. xi. 6 says that without it it is impossible to please God. One of the major principles of St Paul is that we are justified by F. and not by works. There are 2 prin. definitions, corresponding to 2 different kinds, of F.: Theological and Fiducial. (1) *Theological F.* is the assent of the mind to a truth on the authority of God as revealing it. This is F. in the Catholic sense; an intellectual act, but one commanded by the Will (with the assistance of Grace) since revealed Truth transcends Reason and often perplexes it, though it cannot contradict it in the end, since Truth is necessarily one.

(2) *Fiducial F.* is an act of trust and confidence in a person, i.e. in Christ as the Saviour; and Luther and the other Reformers following him declared that this F. alone (*soia fide*) is necessary to

justification (q.v.). Appealing to St Paul's teaching in the epistle to the Romans, and elsewhere that we are justified by F. without works, they radically denied the value and authority of the whole eccles. system, with its hierarchy, sacraments, penitential discipline, etc. The meaning of F. in the N.T. does in fact range from intellectual assent (Jas. 11. 19 and Heb. xi. 6) to complete surrender to a Person, Jesus Christ (2 Tim. 1. 12). In quoting the scripture, therefore, it is important to study the meaning of the particular passage carefully. So also with the expression 'works.' St Paul condemns the works of the Law (Rom. iii. 20); St James requires (11. 15-17) the works of charity. St Paul is contrasting trust in Moses and the Mosaic Law with its observances, with trust in Christ, which does not of course exclude obedience to His law. 'St Paul writes, as a theologian, against the theories of human merit; St James, like a prophet, against a barren and unsympathetic orthodoxy' (Kidd). There is in fact much common ground between Lutheran and Catholic. F., in the Lutheran sense, is equivalent to what the Catholic calls *Fides Formata*, F. informed by charity, without which F. is dead (as James says). Moreover, the Council of Trent affirmed as strongly as Luther that 'the meritorious cause of Justification is our Lord Jesus Christ who merited Justification for us by His Passion.' The real contrast in the N.T. is not between faith and works but between our merits and Christ's (Rom. iv. 4, 5, 24, 25). See LUTHER; JUSTIFICATION; see also B. J. Kidd, *The Thirteen Articles*, 1899; M. Prummer, O.P., *Manuale Theologiae Moralis*, vol. 1, 1915.

Faith-healing is a mind cure, resting on the firm conviction that, as suggested in Jas. v. 14, pain and disease may be dispelled without medical aid, a lively faith in Divine Power being the one *sine qua non*. The miraculous recoveries which took place in the temples of the Gk god Aesculapius may be regarded as instances of F.; so also may some of the cures brought about by belief in the efficacy of relics, shrines, and holy places. The Waldenses, Moravians, and the Peculiar People of a later date all trusted to prayer and anointment with oil for the relief of sickness, while faith cures were an integral part of the beliefs of Pietists, and many sects of Puritans and Methodists, as well as afterwards of the Irvingites and Mormons. Prof. Blumhardt and Dorothy Trudel conceived of healing rather in the sense of the medicine men of savage tribes, that is, as the expulsion from the body of an evil and tormenting spirit, whilst modern Christian Scientists go so far as altogether to deny the existence of physical suffering and disease. (See CHRISTIAN SCIENCE.) Psychologists attribute so-called cures by faith to powers of suggestion which are peculiarly developed in any assemblage where the nervous and emotional activity is high. In Jan. 1931 the Lower House of Convocation of Canterbury passed a resolution in favour of

spiritual healing. The resolution petitioned the Archbishop of Canterbury to appoint a joint committee to draw up a provisional service for Unction (anointing the sick with oil) and Imposition of Hands for temporary use until a permanent and fully authorised form could be issued under Synodical sanction. In 1955 the Archbishop of Canterbury set up a commission to examine and report on the question of Divine Healing. The commission is expected to report in 1957. See J. M. Hickson, *Heal the Sick*, 1924; G. G. Dawson, *Healing; Pagan and Christian*, 1925.

Faithfull, Emily (1835-96), Eng. philanthropist, devoted her life to the improvement of the status, remuneration, and sphere of labour of working women. In 1860 she started the Victoria Press, in which the printing was in the hands of women, and from 1883 to 1881 she continued to publish the *Victoria Magazine*, and to plead in its columns for greater equality between the sexes. Her lectures, both in Great Britain and the U.S.A., revealed to the public her noble aims and the disinterested nature of her work. Her pubs. include *Change upon Change*, 1868, and *Three Visits to America*, 1884.

Faithorne, William (1616-91), painter and engraver, b. London. He was imprisoned as a Royalist in the Civil war, and when released he went to France. He returned to England about 1650 and carried on work as an engraver and print-seller. His engraved portraits include those of Oliver Cromwell and Charles I. F. wrote *The Art of Graving and Etching*, 1662.

Faiyûm, fertile prov. of Upper Egypt, lying W. of the Nile, a little above the head of the delta, and 65 m. from Cairo. Cap. Medinet-el-F. Geographically it is a S. oasis in the Libyan desert, irrigated by means of a canal (Bahr-Yusuf) running through a narrow gorge to the Nile valley. Its area is about 670 sq. m., a portion of which is occupied by a sheet of water, the Birket-el-Kerun (35 m. long), known to the ancients as Lake Moeris, by the shores of which stood one of the wonders of the world, the famous 'Labyrinth.' The chief crops are cereals and cotton, but the prov. is also noted for its figs and grapes. Olives, too, and rose trees, from which the inhab. manuf. attar of roses, are grown. Other products are sugar, flax, hemp, oranges, peaches, and pomegranates, and F. also has a good breed of sheep. The cap., Medinet-el-F., is a great agricultural centre. Important explorations have been made by Flinders Petrie at the sites of ant. cities in this prov. Dr Johnson, Librarian of Oxford Univ., has also made interesting discoveries of papyrus rolls in excavated tombs in this region in the years immediately preceding the First World War. Pop. (prov.) 671,800. See R. H. Brown, *Faiyûm and Lake Moeris*, 1893; P. Viereck, *Faiyûm*, 1928; C. Oston-Thompson and E. W. Gardner, *The Desert Faiyûm*, 1935; J. Ball, contribution to *The Geography of Egypt*, 1939.

Faizabad, or Fyzabad, cap. of the Badakhshan prov., Afghanistan, on the Koksha R., 87 m. ENE. of Kunduz, and N. of the Hindu Kush. Murad Beg deported all its citizens to Kunduz in 1821 and razed the tn, but it is now once more a flourishing entrepôt. Pop. 28,000. See also BADAKHSHAN.

Fajardo, tn on the E. coast of Puerto Rico. There are sugar plantations and orange groves in the fertile environs, whilst the tn itself is a busy entrepôt. It manufs. cigars, soft drinks, and furniture. Pop. 15,336.

Fakaofu, see TOKELAU.

Fakenham, tn 20 m. WSW. of Cromer, Norfolk, England. It has an important cattle market and a 14th-cent. church. Pop. 3000.

Faking, see FORGERY IN ART.

Fakir (Arabic *faqir*, poor) came to mean pious, one who takes his religion seriously;



Canadian Pacific
AN INDIAN FAKIR

with this usage may be compared the name Ebionites. Another name for such people is dervish (q.v.). The F.s of India

are properly Hindu ascetics, who belong to strict religious orders, but F. is also applied to wandering charlatans, who profit by the villagers' superstitions to gain nefarious livelihoods.

'Falaba,' S.S., liner of over 4000 tons belonging to the Elder Dempster Company, torpedoed by a Ger. submarine off the S. coast of Ireland on 27 Mar. 1915, with the loss of over 100 lives. Indignation in America was widespread over this outrage.

Falaise, Fr. tn in the dept of Calvados, on a cliff (*falaise*) above the R. Ante. It is 22 m. SSE. of Caen, and is famous for the great castle of the dukes of Normandy, in which William the Conqueror was b. in



W. F. Mansell

FALAISE CASTLE

The birthplace of William the Conqueror

1027. There is a church dating back to the 11th cent., and another dating back to the 13th cent. The tn suffered very severely during the Second World War. In the SE. suburb of Guilbray a famous fair is held annually in Aug. There are textile manufs. and a trade in horses. Pop. 4600.

Battle of the 'Falaise Pocket.'—The name given to the Ger. débâcle on the W. Front, 12-22 Aug. 1944. On 7 Aug. the Germans, on Hitler's orders, attempted to drive through from Mortain to the coast at Avranches: 5 panzer divs. and 2 infantry divs. took part. After 5 days of heavy fighting, and relentless attacks by the allied air forces upon the Ger. troops, the Ger. commanders decided to attempt to extricate their forces and re-form a N.-S. line further to the E. Already, however, on 8 Aug., Montgomery had ordered an encirclement ancillary to the general allied enveloping strategy, and on 13 Aug., when the Germans started to withdraw E., the Amer. Third Army was

already at Argentan and the Canadians were near F. Thus the Germans were in a pocket between the Brit. and Canadians in the N. and the Americans in the S. Their task was to keep the sides of the pocket apart, and the mouth, between F. and Argentan, open; this they succeeded in doing for some days under fierce allied air and artillery attack, and, despite the mounting pressure of the allied encirclement, they extricated a proportion of their armour. By 16 Aug. the Ger. forces in the pocket were in chaos, and on 19 Aug. the mouth of the pocket was closed. On 20 Aug. the Germans made one last, unsuccessful, attempt to escape. By 22 Aug. the pocket had been eliminated. In the battle the Ger. Army lost the greater part of 8 infantry divs., and part of 2 panzer divs. See Gen. Eisenhower's Report to the Combined Chiefs of Staff, H.M.S.O., 1946. See also WESTERN FRONT IN SECOND WORLD WAR; INVASION OF NORMANDY.

Falangists, Sp. Fascists, who co-operated with Gen. Franco in the Sp. Civil war, 1936-9. Their tendency towards social radicalism brought them up against the Conservative military caste and they were repressed in 1938. Franco, however, assumed the leadership of the F. and they were soon the only political organisation tolerated in Spain. Their former leader, Antonio Primo de Rivera, son of the one-time Sp. dictator, was shot by the Republicans. The F. were undoubtedly under Ger. and It. influence during the Civil war. Since the end of the Second World War the F. have tended to resist the more conservative trend in Franco's policy, such as his improved relations with representatives of the Sp. royal family.

Falashes (from Ethiopic *falas*, a stranger), tribe of Hamitic stock and Jewish religion, who were subject to the kingdom of Tigré in Ethiopia. They speak Ethiopic (or Ge'ez), and their O.T. and other sacred books are written in this language, not in Hebrew. Though their religion is infected with pagan beliefs, such as faith in the potency of the evil eye, they practise a higher morality than their Christian rulers. Unlike their co-religionists, they live by agriculture, not by commerce. Until 1800 they had their own king, and are remarkable for their voluntary segregation from other tribes or sects. Their musical instruments are adduced as further evidence of a close link with the Jewish culture.

Falchion, see SWORN.

Falco, Gian, see PAPINI, GIOVANNI.

Falcon (Lat. *falco*, Teutonic *valken*), a name given to certain members of the Falconidae (q.v.), a family of birds of prey which catch their quarry on the wing. They have short curved beaks with 1 notch in the upper mandible; the wings are long and pointed, and the toes elongated. *Falco rusticolus candicans*, the Greenland F., is white in colour, and is sometimes called the white gerfalcon; *F. rusticolus rusticolus*, the Scandinavian F.,

and *F. rusticolus islandicus*, the Iceland F., migrate southward in winter, the latter occasionally reaching Britain; *F. peregrinus*, which, together with the N. F. and other species, is used in falconry, ranges over Europe, China, Japan, NE. Africa, and NW. India. This species is resident and a passage migrant in England, and is found nesting on lofty cliffs; it is amazingly swift in flight and kills game and birds of all kinds. See also FALCONRY.

Falcón, most northerly state in Venezuela, bounded N. and W. respectively by the Caribbean Sea and the Gulf of Venezuela (also by Zulia), and southward by the state of Lara. Tropical bogs and sandy levels line the coast. Inland trade passes through Coro (q.v.), the cap., the main seaport being La Vela de Coro. Coal and an increasing amount of petroleum are produced. Coro is now being linked by rail with the main system at Barquisimeto. Pop. 258,760.

Falcon Island, one of the Is. of Tonga, lying to the westward of Haapai. A volcanic, 'jack-in-the-box' is., which has disappeared and re-appeared sev. times since a reef was first observed in 1781. Named after H.M.S. *Falcon*, which observed it in 1865. The submarine volcano was again in eruption early in 1955. Each time the is. appears, the Tonga Gov. annexes it.

Falcone, Aniello (1800-65), It. battle painter, is the most famous of Ribera's (q.v.) pupils, and himself the founder of a school. In his battle-scenes, taken both from biblical and secular stories, he shows himself capable of suggesting animation. During Masaniello's revolt (1647), he organised his pupils into the 'Compagnia della Morte' (company of death), and paraded the streets by night to murder Spaniards. F. wisely went into exile in France on the restoration of peace, and won the patronage of Louis XIV, but d. in Naples.

Falconer, Hugh (1808-65), botanist and palaeontologist. During his first stay in India (1830-42) he was superintendent of the botanic garden at Saharanpur, and during his second (1847-55) held a similar post at Calcutta. He discovered the *asafoetida* medicinal plant in India, and urged the cultivation there of tea and the cinchona bark. During his invaluable geological researches in the tertiary deposits of the Siwalik hills he made a splendid find of fossils including the Mastodon and an enormous pre-historic tortoise. His *Fauna Antiqua Sivalensis*, 1846-9, was never finished. He is justly regarded as a martyr to science, for overwork undoubtedly undermined his health.

Falconer, Sir Robert Alexander (1867-1943), Canadian clergyman and educationist, b. Charlottetown, Prince Edward Island, Canada. Educ. at Queen's Royal College, Trinidad, and at London and Edinburgh Univs. Also studied at Berlin, Leipzig, and Marburg. Ordained Presbyterian minister, 1892. Taught N.T. Greek at Pine Hill Presbyterian College, Halifax, from 1893 to 1907, and was principal there from 1904 to 1907.

Appointed President of the univ. of Toronto at the age of 40, being there from 1907 to 1932. Under his guidance the univ. was organised into a highly efficient whole. In 1925 in England he gave the Sir George Watson Lectures on Amer. Hist. President of the Royal Society of Canada and of the Royal Canadian Institute.

Falconer, William (1732-69), poet, b. Edinburgh. He belonged to a large family, all of whom were deaf and dumb except himself. His famous *Shipwreck*, first pub. in 1762, was based on a personal experience, for he was one of the few survivors of a merchant vessel which foundered off Cape Ocolonna, Greece. In spite of the somewhat incongruous mixture of the artificial, elegant style of Pope with the breezy, technical dialect of a sailor, the life and vivid descriptive passages of the poem are ample excuse for its popularity. In 1764 he directed a rhymed lampoon, *The Demagogue*, against Wilkes and Churchill, and in 1769 pub. his *Marine Dictionary*.

Falconet, Etienne Maurice (1716-91), Fr. sculptor, b. Paris. He spent 12 years in St Petersburg (1766-78), where he executed for Catherine II a colossal statue in bronze of Peter the Great, which stood in the square of the senate. He held the anct sculptors in small esteem, which perhaps accounts for the somewhat meretricious taste apparent in even his fine 'Milo of Crotona'.

Falconet, name given to a small field gun introduced in the 15th cent. With culverins, sakers, and demi-cannons, etc., F.s formed the lighter ordnance until the 17th cent.

Falconidae, family of diurnal birds of prey, comprising the falcons, hawks, kestrels, etc., and constituting, with the eagles, vultures, etc., the typical Accipitrines (q.v.). The head is crowned with feathers, and the female is larger than the male; the 2 sexes associate in pairs and mate for life.

Falconry (from O.F. *falconnerie*), the art of training falcons and hawks for the chase. Hawking is commonly regarded as a synonym, but is properly restricted to the practice of F. in the field. Its antiquity is an estab. fact, but no one knows where or when this 'aerial warfare' was first introduced. There are records proving its early popularity in Asia Minor, Turkey, Persia, Tartary, and China, and it is interesting to read Marco Polo's almost incredible yet undoubtedly veracious account of how Kublai Khan, the great emperor of Tartary and China, went hawking in the 13th cent. Pennant has suggested Scythia as the bp. of F., arguing that thence it spread all over N. Europe and especially to Norway, where falconers attained such remarkable proficiency. In India the art seems to have been practised from time immemorial, the hawks being trained to the boldest flights, to stoop at the antelope and wild boar, as well as at the gazelle and the stag. Here, moreover, as in the E. generally, these birds are still used for hunting, and the

native Indian gentry still train their largest falcons to fly gazelle with the assistance of greyhounds. To turn to Europe, it is written how even in the 8th cent. the 'grand fauconnier' in France was 'an officer of great eminence,' with an ann. salary of 4000 florins, and as many as 300 hawks. In England there is mention of F. in the reign of Ethelbert (760). King Alfred is commended as a falconer, and from the Norman Conquest till the 17th cent., kings, princes, barons, lords, and even ladies were affected with the hawking mania, William I, Stephen, Edward III, Henry VIII, Queen Elizabeth, and James I being the most enthusiastic of its royal devotees. Change in fashion, but above all the introduction everywhere of the fowling-piece, which so vastly increased the quarry, whilst at the same time doing away with the difficulty and expense of training and keeping the hawks, led to the rapid decrease of the sport after the Commonwealth, so that, by the end of the 17th cent., F. had fallen into general decay. The last owner of heron-hawks d. in 1871, yet the foundation of the Old Hawking Club about the same time served to prevent the art becoming entirely obsolete. The Old Hawking Club was succeeded by the Brit. Falconers Club, 1926.

Stringent and oppressive laws were early made respecting F., as all other forms of field sport. Thus, under the Normans the privilege of keeping hawks was reserved only for persons of the highest rank, and it was not till the Carta de Foresta had been wrested from King John that the privilege was extended to all freemen. In Edward III's reign, every person finding any species of hawk was instructed by statute to take the same to the sheriff of the co., or to suffer 2 years imprisonment; moreover, the stealing of a hawk was made a felony. According to a decree of Henry VII, the stealing or destruction of falcons' eggs brought on the offender a penalty of imprisonment for a year and a day, the term being reduced under Elizabeth to 3 months. A 16th-cent. ordinance, which forbade hawking from Easter till after the harvest, is of interest as indicating a consideration for agriculture and a smaller regard for the falconers' interests. Tradition assigned the sort of hawk proper to persons of different ranks: thus the eagle was for an emperor; the gerfalcon and tiercel of the gerfalcon, for a king; the falcon gentle and the tiercel gentle, for a prince; the falcon of the rock, for a duke; the falcon peregrine, for an earl; the bastard, for a baron; the sacre and sacret, for a knight; the lanner and lanneret, for an esquire; the merlyon or merlin, for a lady; the hobby, for a young man; the goshawk, for a yeoman; the tiercel (of the goshawk), for a poor man; the sparrow-hawk, for a priest; and the musket (male sparrow-hawk) for a holy water clerk.

'Eyasses,' or 'eyesses,' are birds taken from the nest and reared wholly or partially in confinement. Eyass peregrines may be flown at grouse, partridges,

wild duck, pheasants, rooks, and magpies. 'Passage,' or wild-caught, falcons were trapped during the migration or passage from N. to S. in the autumn by means of a decoy-pigeon and a bow-net. They are usually better-tempered, swifter, and higher-couraged than the eyass, and are especially used for rooks, herons, and gulls. The training of the eyass differs initially from that of the passage-hawk, as it has everything to learn, including the way to catch and kill its own prey. The nestling is put on a straw-covered platform in an outhouse, and is fed 3 times a day on lean beef or other suitable raw meat. If it receives insufficient food, 'hunger-traces' will appear like knife-marks across the growing feathers. Before the young hawk is allowed to fly, 'jesses,' that is, leather straps are set round its legs, and above them bells are attached with thongs called 'bewits.' It is then allowed some weeks of liberty, when it is said to be 'flying at hack,' the object being to give it strength on the wing; desire for food brings the bird, at intervals, back to its home.

The training for eyasses after hack is practically the same as that for wild-caught falcons. 'Hooding,' that is blind-folding it by means of a leathern cap, is the first operation as a 'hooded' bird will sit quite quietly, and will not _____ her feathers or, otherwise get out of hand by 'bating,' that is, fluttering from the fist or perch. Feeding is always upon the gloved hand. Soon the hawk is 'called off' to the 'lure.' The most common kind of 'lure' consists of a flat leather-covered piece of lead, to which pigeon's wings are attached, and also on either side a piece of raw meat. This is later used for luring the falcon back to its owner after a fruitless flight, and this is why the bird is made acquainted with it from the very first. During the training, the hooded hawk is perched on an assistant's hand, being fastened thereto by a line, whilst the falconer, at a distance of 20 yds or more, flourishes the lure. When the bird is unhooded, it flies to the lure and is encouraged to feed on it. After a time it can be trusted to do this without being held by the line. It is then ready to be flown at wild game. The elaborate processes which belong to the management of a hawk are responsible for the development of a whole technical language to describe them. A few have already been mentioned; whilst as regards the behaviour of the hawk in the field, 'to wait on' means to circle round the falconer's head (the higher the better) in the expectation of game being flushed; 'to bind,' to fasten on the quarry in the air; 'to stoop,' rapidly to descend on her prey from a height.

Hawking has an extensive bibliography including Dame Juliana Berners' *of St Albans*, 1486; G. Turberville's *Booke of Falconry*, 1575; H. Schlegel and A. Wulverhorst, *Traité de Falconnerie*, 1844-53; and the standard Eng. work entitled *Falconry in the British Isles*, by F. Salvin and W. Brodrick, 1855. See

also G. E. Freeman and F. H. Salvin, *Falconry: its Claims, History and Practice*, 1859; G. Lastelles, *Falconry* (Badminton Library), 1892; E. B. Michell, *The Art and Practice of Hawking*, 1900; G. Blaine, *Falconry*, 1938.

Faldstool, originally a folding seat, which a bishop would use when not enthroned in his own cathedral. The word was later applied to a prayer desk.

Falémé, important trib. of the Senegal in Senegambia, W. Africa. Rising in Futa-Djalou, it flows northward to the confluence above Bakel. Cascades and rapids impede all navigation 120 m. from the mouth.

Falerii (modern Civita Castellana), one of the 12 chief cities of Etruria, situated on a



A GATE AT FALERII

height 32 m. N. of Rome. Reduced by Camillus (q.v.) in 394 bc. it revolted at the end of the 1st Punic war, and was destroyed by the Romans (241 bc). A new tn was built in the plain.

Falernian Wine, famous Rom. wine grown in Campania. Wine is still grown near Falerno under Vesuvius, but is of no great quality.

Falguère, Jean Alexandre Joseph (1831-1900), Fr. sculptor and painter, studied at the Ecole des Beaux-Arts. His statues are superior to his work in oils, but in these latter he displayed a fine appreciation for delicate gradations of light and shade. Of his oil paintings 'Acis and Galatea' deserves mention; his 'Wrestlers' and 'Fan and Dagger' were acquired by the Luxembourg. Splendid and arresting vitality animates all his sculpture, notably in his 'Triumph of the Republic', 1881-6, a quadriga for the Arc de Triomphe in Paris. 'Joan of Arc', 'Balsac', and 'Lamartine' exhibit his skill in portraiture.

Faliero, Marino (c. 1274-1355), doge of Venice. He gained a decisive victory in 1346 over the Hungarians who were trying

to storm Zara, but after his election as doge in 1354 his good fortune deserted him. He sided with the mob in an attempt to destroy the power of the nobility and make himself prince of Venice. But the plot failed, F. was executed, and the Council of Ten became stronger than ever. Byron and Swinburne wrote poems on the theme of F.'s downfall.

Falk, Paul Ludwig Adalbert (1827-1900), Prussian statesman. It was F. who, as minister of education under Bismarck (q.v.) (1872), drafted the 4 measures known as 'Kulturkampf,' by which the state arrogated to itself direct control over eccles. matters. A reaction in governmental policy forced F. to resign in 1879.

Falkenhayn, Erich Von (1861-1922), Prussian gen., b. Thorn. Was in the China Expedition, 1900. Chief of staff of the XVI and later of IV Army Corps. Appointed in 1911 commander of 4th Guards (infantry) regiment. Gen., 1913. Ger. minister of war in 1914. Chief of the Ger. H.Q. staff and successor to Gen. Von Moltke, the frustration of whose plans at the first battle of the Marne and in E. Prussia called for a reconstruction of the staff. His staff work was undeniably good, and though aided by Von Mackensen and the popular idol Hindenburg, credit is mainly due to him for the battle of Tannenberg on the E. Front, the repulse of the Allies at Loos, Neuve Chapelle, and elsewhere on the W. Front, and the failure on the Gallipoli peninsula. In 1916, however, the Ger. armies met with disaster at Verdun, where Pétain repulsed probably the heaviest blows delivered in the war, and on the Somme, where the great retreat to the Hindenburg Line had to be organised. These Ger. failures were capped by the sudden entry of Rumania into the war; but F. proved equal to this new belligerent, and gradually reduced its army to a negligible quantity. In these operations he was commander of the Tenth Army. The Ger. Press, however, were disappointed over the general results of 1916, and F. was accordingly shelved for Hindenburg, going on a mission to Turkey. After this he dropped out of public notice, and was put on half-pay at his own request in 1919. See life by H. v. Zuehl, 1926.

Falkenhörst, Nikolaus von (1886-), Ger. soldier in the First and Second World Wars. Lieutenant-gen. in command of the 21st Army Corps in the Polish campaign (1939). Promoted gen. of infantry and put in command of the forces which seized Norway and expelled the Brit. forces (May 1940). Commander in the White Sea region in the Russo-Ger. campaign, July 1941. Superseded in 1944 by Lothar Rendulic (Nov. 1944). Tried by a war crimes tribunal in 1946 and sentenced to death, the sentence later being commuted to one of life imprisonment.

Falkirk, municipal burgh and mkt tn, 11 m. SE. of Stirling, in Stirlingshire, Scotland. It stands high and overlooks

the fertile Carse of F. To the N. and S. respectively pass the Forth and Clyde and Union Canals, whilst its port, Grangemouth, is $2\frac{1}{2}$ m. to the NE. Within 3 m. of the tn are the Carron ironworks and some extensive coal-fields, which account for the supremacy of F. in the light casting trade of Scotland. Local market days have reduced the importance of its 3 ann. crysts or fairs. Historically F. is noteworthy as the scene of 2 battles, one in 1298, when Edward I defeated Wallace, and the second in 1746, when the miserable performance of the Brit. dragoons under Gen. Hawley secured an easy victory for Prince Charles. The remains of Sir John de Graehame, a friend of Sir Wm Wallace, and those of Sir John Stuart, who were slain at the battle in 1298, lie in the churchyard. F. with Stirling and Grangemouth send a member to parliament. Pop. 38,000.

Falkland, Lucius Cary, 2nd Viscount (c. 1610-43), royalist, educ. at Trinity College, Dublin. He succeeded to his father's Scottish viscounty in 1633, and entered parliament in 1640. The excesses of the Opposition gradually forced him to the Royalist side, and when the Civil war broke out he loyally supported the king, being appointed secretary of state, 1642. But he was out of sympathy with most of those around him and he was killed at Newbury, having previously declared his desire to be 'out of it 'ere night.'

F.'s character is vividly and lovingly described by his friend, Clarendon, who wrote 'mankind could not but admire and love him.' He was a scholar in his own right, a lover of literature and the arts, and a patron of poets. He has become the example of the ideal cavalier. See life by J. A. R. Marriott, 1907.

Falkland, Samuel, see **HEIJERMANS**.

Falkland, royal burgh, 9 m. ENE. of Kinross, in E. Fife, Scotland, created in 1458 by James II. It is an old-world vil., noted for its anct palace, which was the hunting seat of the Royal Stuarts from 1400 to 1603. The S. wing was completed by James V, who d. there in 1542; it is still intact. Linen weaving by power, and linoleum manuf. are carried on. Pop. 1000.

Falkland Islands, group forming a Crown colony of Great Britain in the S. Atlantic Ocean, lying some 300 m. E. and somewhat to the N. of the Straits of Magellan between 51° and 53° S. lat., and 57° and 62° W. long. In addition to the 2 main is., known as E. and W. F., which are divided by the F. Sound, the group comprises about 200 smaller is. clustered around them within a space of 120 m. by 60 m. The area of the group, according to the Admiralty chart, is: E. F. and adjacent is. 2580 sq. m.; W. F. and adjacent is. 2058 sq. m. The coast line is deeply indented, and has many fine harbours and anchorages. The surface of the is. is hilly, reaching a maximum elevation of 2315 ft in Mt Adam on W. F. There are no riva. navigable at any distance from the coast. The whole area is wild moorland

interspersed with outcrops of rock and angular boulders called 'stone runs' the origin of which is conjectural. The soil is mainly peat varied by large areas of sand. The general appearance of the land is one of bleak inhospitality. Trees are almost entirely absent and the scenery is not unlike that of parts of Scotland. There is no cultivation except near the farm settlements and shepherds' houses where vegetables, oats, and hay are grown. The climate is characterised by the same seasonal variations as in the U.K., though the winters are slightly colder and the summers much cooler than in London. The ann. rainfall averages only 30 in. The only tn is Stanley, the cap., situated on a natural harbour entered from Port William, at the NE. corner of the group. The whole acreage of the colony is divided into sheep farms. The colony has no resources of known value apart from the production of wool, skins, and tallow. A large number of sheep are exported to Chile. The pop., which in 1955 was 2249, is entirely white and has been derived largely from the U.K. There is a considerable element of Scandinavian blood. The F. I., called by the Fr. 'Iles Malouines' and by the Spaniards 'Islas Malvinas,' were discovered on 14 Aug. 1592, by John Davis in the *Desire*, one of the ships of the squadron sent to the Pacific under Cavendish. Capt. Strong in the *Welfare* sailed between E. and W. F. in 1690 and called the passage the F. Sound in memory of Lucius Cary, Lord F., and from this the group afterwards took its Eng. name of 'Falkland Islands,' although this name does not appear to have been given to it before 1745. The first settlement was estab. in 1764 by de Bougainville on behalf of the king of France at Port Louis on E. F., but in the following year Capt. Byron took possession of W. F. and left a small garrison at Port Egmont on Saunders is. The Spaniards bought out the Fr. and forcibly ejected the Brit., 1766-70. Later the group remained without voluntary occupation until in 1829 Louis Vernet, who enjoyed the nominal protection of the Rep. at Buenos Aires, planted a new colony at Port Louis. Finally, in 1833, Great Britain, who had never relaxed her claim to the sovereignty of the F. I., expelled the Argentine soldiers and colonists, and resumed occupation, which has been maintained without interruption to the present day. In 1844 the H.Q. of the gov. were removed from Port Louis to Stanley, then called Port William. On 8 Dec. 1914 the F. I. were the scene of the naval battle in which Adm. Sturdee destroyed Adm. Graf von Spee's squadron (see next article). A memorial commemorating this victory was unveiled at Stanley in 1927.

See L. B. Mackinnon, *Account of the Falkland Islands*, 1840; G. Schulz, *The Falkland Islands*, 1891; J. R. St Johnston, *The Falkland Islands*, 1920; V. F. Boyson, *The Falkland Islands* (with notes on the natural hist. by R. Vallentin),

1924; J. Goebel, *The Struggle for the Falkland Islands: a Study in Legal and Diplomatic History*, 1927; F. C. Macdonald, *Bishop Stirling of the Falklands*, 1929; L. Harrison Matthews (of the *Discovery Expedition, 1924-7*), *South Georgia: The British Empire's Sub-antarctic Outpost*, 1931; F. D. Ommaney, *South Latitude*, 1938.

Falkland Islands, Battle of. Naval battle of the First World War, fought on 8 Dec. 1914, in which the Brit. Adm. Sturdee, completely avenged the defeat of Rear-Adm. Cradock off Coronel (q.v.). The Ger. squadron comprised the armoured cruisers *Scharnhorst* (flagship) and *Gneisenau*, light cruisers *Leipzig*, *Dresden*, and *Nürnberg*, under the command of Adm. Graf von Spee. The Brit. squadron consisted of the 2 battle cruisers *Invincible* and *Inflexible* (17,250 tons, 25 knots, carrying 8 12-in. and 16 4-in. guns), the armoured cruisers *Cornwall* and *Kent* (each 9800 tons and carrying 14 6-in. guns), and the light cruisers *Glasgow* and *Bristol* (4800 tons, 2 6-in. and 10 4-in. guns). The *Scharnhorst* and *Gneisenau* carried 12 8-in. guns. The intention of the Ger. squadron was to bombard the Falkland Is. and von Spee reached the vicinity of this Brit. colony on 8 Dec. The appearance of the Brit. squadron was a complete surprise and the Ger. ships promptly took to flight. Their speed, however, was inadequate, and they were brought to bay, the Germans being outmanoeuvred for position and out-ranged in gunfire. All the Ger. ships, with the exception of the *Dresden* (q.v.), were sunk. The Ger. casualties were 2000 officers and men, the Brit. 7 killed and 4 wounded. There were no survivors of the *Scharnhorst*, while of the *Gneisenau's* complement of 700, fewer than 100 were rescued. Von Spee himself perished. The vital importance of this victory lay in the fact that it prevented von Spee from establishing himself in the W. Indies and thereby raiding 20 million tons of sea-borne grain and meat supplies intended for Great Britain. On the defeat of Cradock's squadron at Coronel, the Brit. Admiralty had at once prepared this counterstroke, and Adm. Sturdee, on 11 Nov., steamed away with the cruisers *Inflexible* and *Invincible*, reaching the Falklands with almost unprecedented speed. By 7 Dec., when anchored in Port Stanley, he had been reinforced by Adm. Stoddart in the *Carnarvon* and by the cruisers *Cornwall*, *Kent*, and *Glasgow*. The Brit. squadron coaled all night, and was still coaling when the look-out station reported that the Ger. squadron was approaching, it being then nearly 8 a.m. By 10 a.m. all the Brit. ships were under way, and the first shots were fired just before 1 o'clock. In 8½ hrs from that time the battle was over; the Ger. squadron having no reasonable chance against the attacking squadron. The whole campaign in these waters is of importance in that it illustrates Great Britain's essential vulnerability. There was no parallel in Brit. maritime hist. to the dangerous economic

consequences that threatened Coronel. Brit. national security was actually in danger through a more or less obscure defeat in a remote corner of the Pacific at the hands of a detached raiding squadron, and only the prompt extinction of the raiders could have restored confidence to the merchant navy.

Falkland Islands Dependencies, area in the Antarctic (q.v.) between longs. 20° and 80° W., claimed by Great Britain and also by Argentina and Chile. There is no permanent pop. in the Dependencies except in S. Georgia where the figures fluctuate with the seasons of the whaling industry. Apart from sealing on a small scale, the only industry in the Dependencies is whaling, and whale and seal oil and by-products of the whale are their sole products. S. Georgia has had since 1909 an administrative officer who is also resident magistrate. The N. Is. were largely explored by Brit. and Amer. whalers in the early 19th cent. The S. peninsula (Graham Land, q.v.) was visited by Fr., Brit., Norwegian, and Amer. expeditions, but has been mapped since 1943 by the Brit. F. I. D. Survey, which sends out young men for 2- and 1-year periods to Brit. bases at Port Lockroy, Deception Is., Hope Bay, Argentine Is., Admiralty Bay, and Siguy Is. as surveyors, medical officers, meteorologists, etc. The F. I. and D. Meteorological Service was estab. in 1950 and has reporting stations at Stanley, Grytviken, and the F. I. D. bases. A series of scientific reports is pub., and the geological structure is written up in the Geology Dept of Birmingham Univ. See also SOUTH GEORGIA; SOUTH NETHERLANDS. See E. W. Hunter Christie, *The Antarctic Problem*, 1951; E. W. K. Walton, *Two Years in the Antarctic*, 1955; and the jour. *Polar Record*, 1943 ff.

Falkner, William Harrison, see FAULKNER.

Fall, The, the first sin of Man, and the cause of Man's moral and spiritual infirmity, described in the Bible as the yielding of Adam and Eve to the Temptation of the Serpent in the Garden of Eden. This account of the entrance of sin into the world is a fundamental doctrine of a theology professed by Christians—Catholics and Protestants alike. By sin, Adam lost the divine life of supernatural grace which was his heritage. Inasmuch as Adam is the supreme head or source of humanity, all mankind bears the defect transmitted as the consequence of Adam's primary transgression of God's will. To deliver man from the power of this 'Original Sin' Jesus Christ (the Second Adam) by his Incarnation and Atonement restored divine life to mankind and provided a saving remedy for the F. See ORIGINAL SIN; see also N. P. Williams, *The Doctrine of the Fall and Original Sin*, 1928.

Fall River, city and port of entry on Mt Hope Bay, at the mouth of the Taunton R., in Bristol co., Massachusetts, U.S.A. It is one of the chief centres for the manuf. of cotton goods in the U.S.A. Other

industries include the dyeing and finishing of textiles and the manuf. of rubber, paper, brass, bronze, and silver products, gas ranges, hats, and clothing. The F. R., a small affluent of the Taunton, which here makes a descent of about 130 ft in half a m., furnishes water power for the city's industries. Many of the buildings of F. R. are of red granite, quarried in the vicinity. It is the seat of the Bradford Durfee technical institute. Pop. 112,000.

Falla, Manuel de (1876-1946), Sp. composer, b. Cadiz. At the Madrid Conservatory he studied composition under Pedrell, the founder of the modern national Sp. school of composition, and the piano under Tragó. In 1905 his *La vida breve* won the prize offered by the Academia de Bellas Artes for a national opera but it waited 8 years for its first performance. From 1907 to 1914 F. lived in Paris, receiving friendly encouragement from Debussy, Ravel, Dukas, and others, but he returned to Spain at the beginning of the First World War. His ballet *The Three-Cornered Hat*, was first performed by the Diaghilev Russian Ballet in London in 1919, being very popular. The ballet *El amor brujo* (*Magician Love*) was also successful, and other compositions are *Master Peter's Puppet Show* (*El retablo de Maese Pedro*), a marionette opera; *Nights in the Gardens of Spain*, 1916, for piano and orchestra, a harpsichord concerto, and *Seven Spanish Popular Songs*, 1922. F. left Spain in 1940 for Argentina, where he d. at Alta Gracia.

Fallacy (from Lat. *fallax*, deceptive), false reasoning or argument. In spite of the countless varieties of confused thought and ambiguity, it is customary to adopt some classification of F. Thus Bacon in his *Novum Organum* divides them into 4 *Eidōla* (False Appearances), whilst Mill regards all F.'s as belonging to one of the 5 following categories: (1) Fallacies of Simple Inspection, which embrace all Natural Prejudices; (2) Fallacies of Observation; (3) of Generalisation, including Induction; (4) of Syllogism or Ratiocination; and (5) of Confusion, under which come all cases of ambiguous language. But by far the most famous subdivisions of F. are those based on Aristotle. According to him all F.'s are either material, that is misstatements of facts, said therefore to be *extra dictionem*, or *in re*; verbal that is arising from the misuse of words; or formal or logical, that is arguments which transgress the laws of true demonstration, technically called the Syllogism. Fallacies of the second and third species are said to be *in dictione*, or *in voce*. Under the first heading come *Petitio principii* (q.v.), or *Circulus in probando* (arguing in a circle); *Non sequitur*, or the F. of false cause; *Ignoratio Elenchi*, or irrelevant conclusion; and F. of Accident from the general to the particular.

Fallada, Hans (1893-1947), Ger. writer, b. at Greifswald. His real name was Rudolf Ditzgen. His novels depict in a realistic fashion the everyday problems of the ordinary man, as in his famous

Kleiner Mann, was nun?, 1932, trans. as *Little man, what now?* Both this and his *Alles Hers geht auf die Reise*, 1936, were made into films. Others works include *Wer einmal aus dem Blechnapf frisst*, 1934, *Wir hatten mal ein Kind*, 1935, *Der ungeliebte Mann*, 1945. See also his autobiographical works *Damals bei uns daheim* 1942, *Heute bei uns zu Hause*, 1943, and *Der Alpdruck*, 1947.

Fallerleben, Hoffmann von, see **HOFFMANN, AUGUST HEINRICH**.

Fallières, Armand (1841-1931), Fr. statesman, b. near Agen, S. France, son of a blacksmith. He studied law and became a barrister at Nérac. F. entered the chamber of Deputies in 1876, and was under-secretary of the interior to J. Ferry in 1880, and then, successively, minister of the interior and prime minister. He was president of the Fr. Rep. 1906-13 and president of the Senate 8 times.

Falling Stars, see **METEOR**.

Fallopian Tubes, The, from Gabrielle Falloppio (q.v.), canals which lead from the peritoneal cavity into the uterus, there being one on each side. The free, peritoneal cavity ends of the F. T. have finger-like fringes, known as fimbriae, and these are thought to assist in directing the ovum liberated from the ovary (q.v.) into the canal, and thence into the uterus. The F. T. function is that of an oviduct. If the tubes are blocked no ova can reach the uterus (q.v.). See **STERILITY**.

Fallopippo (or **Fallopius**), **Gabriele** (1523-1562), It. anatomist, prof. of anatomy at Pisa and Padua. His chief discovery was the function of the tubes now called Fallopian after him, whilst in the anatomical field he made careful studies of the sphenoid and ethmoid bones, the internal structure of the ear, and the female generative organs. The *Observationes anatomicae* (Venice), 1561, was the only treatise by F. to appear in his lifetime. His collected works, under the title *Opera genuina omnia*, also pub. at Venice, appeared in 1584.

Fallow (probably derived from the O.E. *fealg*, a harrow), land ploughed and tilled but not sown for a certain period, usually a year. It was early discovered—witness the Mosaic injunction that every 7 years the land must have a 'Sabbath rest', i.e. 'lie fallow'—that the soil decreases in fertility if continually sown with grain. Thus farmers resorted to the practice of 'fallowing,' a practice which may well be as old as agriculture itself, the object being to destroy the weeds, such as couch grass (*Triticum repens*), to disintegrate the soil, and to give it a thorough aeration. The Romans left their cultivated fields F. every alternate year, but improved crop rotations have well-nigh done away with the need of 'bare fallow,' except, perhaps, for extremely clayey soils which cannot otherwise be adequately cleaned. The need for a F. has also been reduced by the discovery of weed-killers such as T.C.A. and 'Dalapon' which kill couch, but these must be applied on bare ground some time before sowing a crop because of harmful residual effects. Sometimes a half or

bastard F. is taken in the late summer following an arable sillage crop or ploughed-up ley, and although this is less effective than a full F. it does not leave the land bare for the whole year.

Fallow Chat, see **WHATEAR**.

Fallow-deer, name given to sev. species of Cervidae, a family of ruminant artiodactyl mammals; they are characterised by the expansion of the upper part of their antlers into palmated form. Usually they stand about 3 ft high, and have small heads, large ears, and rather long tails. In colour they are fawn, with a number of large white spots, or they may be yellowish-brown, or, more rarely, dark brown. *Dama dama*, the commonest species, is a native of N. Africa and the countries bordering the Mediterranean, but was introduced into Britain at an early period; *Cervus mesopotamicus* is a native of the mts of Laristan; *C. giganteus*, erroneously called the Irish Elk, is a fossil deer of enormous size, the antlers having in some cases a span of 11 ft.

Fallow Finch, see **WHEATEAR**.

Falls, Cyril Bentham (1888-), military historian, educ. at Bradfield College, Portora Royal School, Enniskillen, and London Univ. He served with distinction in the First World War and from 1939 to 1953 was military correspondent of *The Times*. He was Chichele prof. of the hist. of war at Oxford, 1946-53. Pubs. include the official hist. of the Brit. campaigns (First World War) in Egypt, Palestine, Macedonia, and France; and *A Short History of the Second World War*, 1948.

Falmouth: 1. Seaport and mkt tn in Cornwall, England. It lies 7 m. S. by W. of Truro, and its harbour is one of the finest in England. There are 4 graving docks, and foundries, engineering works and ship repairing yards. F. has a wonderful climate, and nowhere in the S. of England do tropical plants flourish more luxuriantly. It has become a popular holiday centre. Pendennis Castle was built in 1543 for the defence of the harbour, which was formerly the anchorage of the once-famous tea clipper, the *Cutty-Sark* (q.v.) (now moored in the Thames at Greenwich), and is now a favourite yachting water. Millions of oysters are dredged from the harbour every year. Pop. 17,036.

2. Tn 18 m. E. of Montego Bay in Cornwall co., Jamaica. Sugar, coffee, and bananas grow in the dist. Pop. 2560.

Fale Bay lies 25 m. S. of Table Bay, in the SW. of the prov. of the Cape of Good Hope, South Africa. The first Brit. occupation of the Cape took place here, 1795, when a force landed under the command of Gen. Craig. Recently the heights dominating F. B. have been heavily fortified.

Fale Hellebore, see **VERATRUM**.

False Imprisonment, the unlawful detention anywhere of any person against his will. In Scots law, the term is 'wrongous imprisonment'. The remedies are an application for *habeas corpus* (q.v.) to procure release, a civil action for

damages, or a prosecution of the unlawful detainers. See **MALICIOUS PROSECUTION**.

False Money, see **COINING**.

False Position, in arithmetic, a former method of solving a problem by one or two suppositions (also called the 'rule of trial and error'), now largely replaced by the direct method of equations.

False Pretences, see **FRAUD**.

False Swearing, see **PERJURY**.

Falsetto, expression denoting an artificial high register of the male singing-voice, such as the male alto or the top notes in yodelling. The counter-tenor (q.v.) is a natural high voice, not obtained by F.

Falsification of Accounts was made a misdemeanour, punishable with penal servitude for 7 years, under the Larceny Act of 1861, and in Scotland is an offence under the Debtors Act of 1880. By the terms of the former Act every director or officer of a public company or body corporate is liable to the above penalty if he omit to make a full and true entry of properties received in the proper books or accounts, his purpose being to practise fraud; or if he falsify, mutilate, or destroy any book or valuable security belonging to his company or corporation; or if he make a false entry or omit to set down an important particular, or if he concur with others in doing either of these two things; or, again, if he make, circulate, or pub. any written statement of account which he knows to be untrue in any important particular, or if he concur in doing any of these three things. By the F. of A. Act of 1875 the terms of the above Act, with the penalties attaching thereto, were extended to clerks, officers, or servants who may try in any of the above ways to defraud their employers. See **EMBEZZLEMENT**.

Falster, Dan. is., 30 m. long, and varying from 2 to 13 m. in breadth, off the S. coast of Zealand (Shjælland) in the Baltic Sea. The chief tn is Nykøbing. The soil is well watered and yields good crops. Area 200 sq. m.; pop. 47,100.

Fălticeni, or **Folticeni**, tn 65 m. S. by E. of Chernovtsy on an affluent of the Seret, in the prov. of Suceava, Rumania. Pop. (1948) 10,563, one-quarter Jewish.

Falun, or **Fahlun**, tn and cap. of the dist. (län) of Kopparberg, 50 m. W. of Gävle in Sweden. The Kopparberg Mining Company, which has been in existence since 1284, controls the oldest copper mines of Europe. Up to the year 1900 there had been mined some 35 million tons of copper ore. Its present copper output is insignificant, but the company owns many iron-ore mines and large sulphate and sulphite and paper mills. F. has 2 medieval churches and a 17th-cent. tn hall. It has also an excellent industrial museum. Pop. 18,127.

Fama, in classical mythology, the personification of Rumour, later identified with Evil Report, and worshipped at Athens and Smyrna. Sophocles represented her as the daughter of Hope.

Famagusta (Gk *Ammochostos*), the chief port of Cyprus, on the E. coast, 2½ m. S. of the anc. Salamis. F. was founded as Arsinoe by Ptolemy II in 247

so and grew in importance after the sack of Salamis by the Arabs c. 649. The primalist see of Cyprus was then transferred to F. where it remained till the Lusignan period. After the Crusaders had been expelled from Syria F. became one of the richest trading cities of the Levant. It decayed rapidly after its capture by the Genoese in 1373. F. fell to the Turks in 1571 after a costly siege; thereafter no Christians could live within the walls. The Greeks built and still inhabit the suburb of Varosha. The superb Venetian walls, built in the 16th cent., the Gothic cathedral of St Nicholas, now a mosque, and the remains of numerous churches give F. very great antiquarian interest. The harbour is being improved. There is a good road to Nicosia; the former railway is now disused. Estimated pop (1954) 20,900.

Familiar (from Lat. *familiaris*, to do with the family), a demon or supernatural spirit, who is the slave of wizards, magicians, and all necromancers, and who responds to his master's call and carries out his wishes. The idea of such an attendant spirit is world-wide. Thus the Arabs used to believe in Aladdins or genii of the lamp. F.s are frequently animals.

Familiars of the Holy Office were lay officers of the Court of Inquisition whose chief duties were to apprehend and imprison the accused.

Familists, see FAMILY OF LOVE.

Family. The F. in some form or other seems to be a universal human institution, although there are forms of legitimate union that only just merit the term: e.g. the group of woman, her lovers, and her children among the Nayars (q.v.), the woman and the children dwelling in permanent households but being visited by a succession of lovers who are not husbands in any usual sense of the term. During the 19th cent. a great deal of conjecture was made in order to establish a scheme showing the evolution of the F. from an original primitive promiscuous union, through forms of polyandry (q.v.) to polygyny (q.v.) and so to the Christian ideal of the F., the monogamous union of a man, his wife, and their legitimate offspring. Such schemes are still discussed, although modern anthropology has shown them to be almost completely ill-founded and far too conjectural to be demonstrated satisfactorily. We may classify various types of F. and see them against varying social backgrounds, rather than attempt to build up pseudo-historical schemes that have no basis in fact at all.

The F. as an institution has sev. functions. It permits the procreation and rearing of children of legitimate status (i.e. children whose family affiliation is known and who may later accept their full social roles without conflict or doubt as to their rights to do so); it makes for efficient organisation of units for the production and consumption of food; it may have political and ritual functions also, as among most primitive peoples to-day and as among the anc. Roms. and the Chinese, with both of whom the F. was the basic

religious unit. All these functions may be performed by institutions that vary in form from one society to another, but in general we may distinguish the F. of orientation—that in which children are reared—and the F. of procreation—that in which a man and woman unite to produce legitimate offspring. Every person who marries is a member of each type of F. during his or her lifetime. The F. as a child-bearing unit may be the elementary F. of man, wife, and children, as among ourselves. For economic, ritual, and other purposes a larger unit may be more satisfactory, and many societies have as basic social units the joint F. or extended F., consisting of kinsmen over 3 or 4 generations and their wives and offspring. Such are found in most primitive peoples, and among such as the Hindus, among whom the joint F. was, and to some extent still is, a perpetual corporation owning property generation after generation and not dissolving after every death of a husband. One of the outstanding features of the F. is its instability, a trait that distinguishes it from clans and other descent groups, which are persistent units through time. The joint F. is far less ephemeral than is our own elementary F., and so has certain advantages in many situations. Many societies have institutions which have as their function the extension of the F. in time to avoid its dissolution at the death of one of the spouses; such are the levirate (q.v.), by which a dead husband is replaced by his heir, and the sororate (q.v.), by which a wife is replaced if barren, or, sometimes, at her death.

The W. F. is an unusual type, consisting solely of the elementary F. and being extremely unstable and ephemeral. In some parts of the W., indeed, such as parts of U.S.A. and the W. Indies, the F. is so unstable that a man or woman may be a member of many F.s, consecutively, during his or her lifetime, owing to ease and frequency of divorce. This would seem to be a consequence of the decline in importance of social status ascribed at birth and the greater importance of status achieved by a man's own efforts during his lifetime; of the decline in importance of inherited property; and of certain factors to do with modern industrial life, such as the necessity for social mobility, both in space and up and down a class system, the increasing ability of women to earn their own living and so no longer be economically dependent upon their husbands, and so on. With these go changes in ideals and morals, which make for the acceptance of mobility, divorce, etc. It should, however, be remarked that, whatever the anthropological view, the Christian Church has always regarded the F. as the fundamental unit or keystone of society, deriving its sacred character from the sacrament of matrimony. See L. H. Morgan, *Ancient Society*, 1877; B. Mallinowski, *The Family among the Australian Aborigines*, 1913; B. S. Philipotts, *Kindred and Clun in the Middle Ages and After*, 1913; E. B. Goss, *Hebrew Families*, 1927;

P. Reed, *The Modern Family*, 1929; F. C. Muller-Lyer, *The Family*, 1931; E. B. Reuter and J. R. Runner, *The Family*, 1931; F. Engels, *The Origin of the Family, Private Property and the State*, 1940; E. W. Burgess and H. J. Locke, *The Family*, 1945; J. K. Folsom, *The Family and Democratic Society*, 1945; R. H. Lowie, *Social Organisation*, 1948; R. N. Anshen (ed.), *The Family: Its Function and Destiny*, 1949; G. Emerson (ed.), *The Family in a Democratic Society*, 1949; T. Parsons and R. F. Balos, *Family: Socialization and Interaction Process*, 1956. See also references under MARRIAGE.

Family Allowances, the principle of supplementing wages by a payment in respect of dependent children. The Family Allowances Act, 1945, provided for financial assistance from the Exchequer to over 2,500,000 F.s in which there was more than 1 child. Under this measure, an allowance of 5s. a week was paid to parents for each child after the first in the F. In 1952 the allowance was raised to 8s. for each child after the first, and in 1956 to 10s. for each child after the second. These increases do not, however, indicate improved endowment of the F., but rather the effort, sometimes belated, to offset the persistent fall in the value of money (or the removal of other state benefits). See Eleanor Rathbone, *Disinherited Family: a plea for the Endowment of the Family* (new ed. under the title *Family Allowances*, 1949), which contains a complete survey of the system in various countries.

Family Compact, name given to various treaties between the reigning Bourbon dynasties of Franco and Spain, also including Naples and Parma, during the 18th cent. These treaties were made in 1733, 1743, and 1761. They aimed at establishing the Bourbon dynasties in Italy, and also at checking the expansion of England in the colonies of the Amer. continent at the expense of France and Spain.

Family of Love, or **Familists**, religious sect founded by David Joris (1501-56) at Delft in the Netherlands. They taught that religion was nothing but L. which united man with God, and that there was no need for any doctrine or ceremony. Blunt in his *Dictionary of Sects*, 1874, avers that they also denied the reality of sin, and were Antinomians (q.v.); he divides them into 2 congregations, known as the 'Family of the Mount' and the 'Essentialists.' Their doctrines were brought to England by Henry Nicolai; and in 1575, having been attacked by the Puritans, the members petitioned parliament for toleration. This was not, however, granted, and 5 years later we find Elizabeth ordering them to be put down as a 'damnable sect.' They are mentioned in the writings of George Fox and Henry Moore, but seem to have disappeared during the 17th cent.

Family Welfare Association, voluntary society, founded in 1869 as the Charity Organisation Society to give a definite aim to, and to direct into the most

effectual channels, the large number of benevolent forces at work in England, and particularly in London. The F. W. A. consists of a federation of area committees serving sections of metropolitan London. General policy and principles of action are determined by a central council formed by representatives of area committees and certain additional members. The area committees consist as far as possible of ministers of religion, local administrators, and representatives of the prin. local charities. Some of the main functions of the F. W. A. are to provide a service of advice and guidance in F. and personal problems, to help those who are unable to take advantage of the resources provided by the community and who are in difficulties, to initiate and conduct research into social problems, particularly those affecting F. life, to undertake pioneer work in the field of social service, to provide training for students in F. case-work, etc. The F. W. A. has 7 area offices, administrators 13 citizens' advice bureaux, maintains an old people's homes dept, and an information dept which deals with the status, work, and financial resources of charitable societies generally, and makes enquiries about agencies and individuals for the guidance of persons to whom an appeal for help has been made. The head offices of the council are at Denison House, 296 Vauxhall Bridge Road, London, S.W.1.

Famine, scarcity of food-products of such a nature that the pop. of a dist. or country is reduced to starvation, or the serious danger thereof. The causes are principally meteorological, i.e. prolonged drought, or excessive rainfall and storms, leading to floods and the destruction of crops and stores. Crop diseases and the ravages of locusts and other pests are among other causes. The decimation of an agric. pop. by war, plague, etc., and economic causes which deprive a pop. of means of purchasing food-stuffs, have also contributed to a state of F. The opening up of the world's food products to all nations by the development of transport has been the main reason why the risk of F. has materially declined, and transport facilities are the prin. factor in combating a F. when it occurs to-day. Though serious F.s occurred in Russia in 1892 and 1905, it is chiefly in the E., in such a vast and unorganised country as China, that F. on a large scale is dreaded. Still more marked is the ever-present threat of F.s in India, where the people are to a large extent dependent on agriculture, and where a failure of the monsoon for a single year may result in a total famine of the crop. It is not so much the want of food-supplies that must be combated, as the immediate want of purchasing power resulting from cessation of the only money-producing labour. Thus the great Indian schemes of F.-fighting include not only constant development of irrigation and transport, but elaborate relief works, loans, etc. Problems of food supply and distribution loomed large in Bengal during the Second World War, owing to the rise

in prices of agric. produce and raw material and hoarding of supplies. This was advantageous to the peasant cultivator but fatal for the general pop. of Bengal. It is estimated that 1,500,000 men, women, and children *d.* in Bengal in 1943 and 1944 as a direct result of the F. and the consequent epidemics (see report of Sir John Woodhead's Famine Inquiry Commission, pub. in India 1945).

Famund, or **Faemund**, see **FEMUNDEN**.

Fan. This term, derived from Lat. *vannus*, the F. used for winnowing chaff from grain, is used for various devices for creating a current of air, and thus cooling the atmosphere of a room, as in the propeller-shaped electric F. or in other elaborate devices for regulating the temp., driving fresh air into or otherwise ventilating a room or building. The punkah of the E., attached to a rope which is steadily pulled by a servant, is familiar to all travellers and residents in India. It is, however, as a light implement, carried in the hand and used for cooling the face, that the F. has historical and artistic interest. Of these F.s there are 2 main types, the rigid and the folding F.; the first consisting of a circle or segment of a circle of light material fixed to a handle by radiating plats of wood, etc.; the second in which these radiating plats fold together and bring the flexible leaf into a small flat compass. The folding F. came originally from Japan, and was thence brought to China and so to Europe. In the E., F.s were used by both sexes, and were the central feature in many elaborate ceremonies. The Japanese had war-F.s, coloured bright red, and there are some fans which possess a small pondard concealed in the handle. The Chinese devoted much marvellous art to carving the ivory, tortoise-shell, etc., sticks of the handle. The fixed F. dates from very ancient times. A wooden handle, which once held ostrich feathers, is in the museum at Cairo; it belonged to Amenhotep, the Pharaoh of Egypt of the 17th cent. BC. Feather-F.s carried by slaves and servants are found on monuments of all ages. They were used in the medieval Church to keep flies from the chalice; large feather F.s, *fiabella*, are borne behind the pope in processions; and in many E. and other countries the state-F.s are attributes of royalty and power. The folding F. was used in England in the reign of Henry VIII. They were introduced from Italy to France by Catherine de' Medici. Spain was the centre for the decoration of F.s, while the carved and decorated framework was made in France and sent to Spain. In the 18th cent. many of the best artists, Boucher, Watteau, Lancaet, etc., designed the decorations and scenes to be painted on F.s, and Fr. F.s of this period, painted on fine vellum, called 'chicken skin', silk, etc., are highly prized. Charles Conder painted many exquisite silk F.s. There is a fine collection of F.s of every age and country in the Victoria and Albert Museum, S. Kensington, London.

The design of a F. depends mainly upon

the amount of air which it is required to move and the pressure against which it has to move. F.s for moving large vols. of air against very little pressure, such as ventilating F.s, have either large blades (about 3 ft long) and revolve slowly, or small blades and revolve quickly. F.s which have to compress or exhaust air against a pressure of 2-in. water gauge or more are usually centrifugal and are constructed on much the same principle as the centrifugal pump. *Centrifugal* or *paddle-wheel* F.s are those in which the impeller discharges air in a direction at right angles to the axis of the shaft. These F.s are used for dry apparatus, forcing draughts for boilers, dust exhausting, and the conveying of grain and other similar materials. The h.p. of the motor required to drive the F. depends on its use; a small domestic F. only requires a motor of $\frac{1}{2}$ h.p., but large forced draught blowers, such as are used in power-houses, require anything up to 50 h.p. To secure economy of power the right type of F. must be chosen. For ventilation purposes a propeller F. should be used. *Propeller* or *air-screw* F.s are those having impellers which discharge the air in a direction parallel to the driving shaft, the impeller being that part of the F. which in rotating imparts movement to the air. One of the most common uses of a F. is on the engine of a motor vehicle, where it is situated behind the radiator. Belt-driven from the crank-shaft, its purpose is to increase the efficiency of the cooling system by accelerating the flow of air through the radiator tubes. Where the air is sucked down a duct the duct should be at least of the same diameter as the F. blades, and sharp bends should be avoided in the ducts; but where sharp bends and small ducts have to be used, a centrifugal F. is the best.

Fan-bearer, see **FLABELLIFERA**.

Fan Vaulting, in architecture, a method of vaulting employed in the Perpendicular style, and so called on account of its resemblance to a fan. The ribs radiate from one point in the same curve, and are equidistant, terminating at the apex of the ceiling. The intermediate spaces between the ribs are generally filled in with smaller ribs and with decorative ornaments which give it the name of *fan-tracery*. The ceiling of Henry VII's chapel in Westminster Abbey is one of the finest examples. Others may be seen over the staircase of Christ Church, Oxford; in the cloisters at Gloucester; and at King's College Chapel, Cambridge; St George's Chapel, Windsor; Sherborne Abbey; and the Divinity School, Oxford. **Fanariots**, or **Phanariots**, descendants of the Greeks of noble birth who remained in Constantinople after its capture by Mohammed II in 1453; so called from Fanar, the quarter in which they dwelt, they rose at one period to great influence in Turkish affairs. The *Ypsilantis* (q.v.) were F.

Fandango, one of the many Andalusian folk dances in 3/4 or 6/8 time, danced with, or without, castanets, and needing

very quick footwork. It was known in Europe in the 17th cent. Normally danced by a single couple, it is sometimes performed as a solo.

Fanestris, *Colonia Julia*, see **FANO**.

Fanfare (from Sp. *fanfarria*), flourish of trumpets, used at public ceremonies to announce the approach of some important personage or merely to make a festive opening. It is also used for military signalling, and artistically exploited, in opera, by Beethoven in *Fidelio*, Bizet in *Carmen*, etc.

Fanlight, a glazed sash or window over a door, usually semicircular with radiating bars, suggesting a fan; much used in Eng. Georgian and Regency architecture.

Fanning, coral is. belonging to Britain, situated in the Pacific Ocean in lat. 3° 30' N. and long. 159° 13' W.; area, 15 sq. m. The name is derived from Capt. F., an American who discovered the group; the is. was annexed by Great Britain in 1888. F., together with Washington Is. (66 m. NW. by W. of F. Is.), was included in the Gilbert and Ellice (q.v.) colony by an order in council of 27 Jan. 1916. Pop. of both is., 30 Europeans, employed on Pacific cable station, and 300 Pacific islanders in copra plantations.

Fano (anc. *Fanum Fortunae*; later *Colonia Julia Fanestris*), It. port and bathing-resort, in the Marches (q.v.). It is on the Adriatic, 8 m. SE. of Pesaro (q.v.). It has a fine cathedral, with valuable frescoes, a ruined white marble triumphal arch of Augustus, and a Malatesta (q.v.) castle. During the Second World War considerable damage was caused when the retreating Ger. Army mined sev. buildings, including the bell-towers of 5 churches. There are silk and brick manufs., and a trade in agric. produce, and oil. Pop. (tn) 29,300; (com.) 37,900.

Fane, an is. of the N. Frisian group, situated in the North Sea off the W. coast of Jutland. It belongs to Denmark, and has an area of 20 sq. m. The cap., Norby, is a summer watering place, and contains a school of navigation. The inhab. are engaged in fishing and boating. Pop. 2620.

Fana, **Fangs**, or **Ba-Fan**, race occupying the dist. between the Gabon and Ogowe riva. in Fr. Congo, W. Africa. They have a fine physique, woolly hair, and a chocolate complexion, lighter than that of the negroes. They wear practically no clothing, but tattoo their bodies and deck themselves in jewellery. The men are warlike, and good hunters; they are skilled in iron, brass, and copper work. They are believed to be moving westwards in large numbers. Cannibalism has diminished since their contact with civilisation, but their morals have deteriorated. See Mary Kingsley, *Travels in West Africa*, 1897, and Sir R. Burton, 'A Day with Fana' in *Transactions of the Ethnological Society* (vols. iii and iv).

Fanshawe, Sir Richard (1808-86), diplomat and poet, b. Ware Park, Herts, and educ. at Jesus College, Cambridge. He entered the Inner Temple in 1826, and

afterwards travelled in France and Spain. Until 1838 he was secretary to the Brit. embassy at Madrid, and on the outbreak of the Civil war fought on the Royalist side. He became secretary to the prince of Wales, and in 1848 naval treasurer under Prince Rupert. At the battle of Worcester (1851) he was taken prisoner, but was released, and took refuge on the Continent, returning to England at the Restoration. He d. in Madrid, where he had been sent as ambas. in 1664. He trans. Guarini's *Pastor Fido*, 1647, Camoens's *The Lusiad*, 1655, and wrote some original verse.

Fantasia (It. signifying fancy, caprice) is the name applied to musical compositions in which the composer follows his fancy, and is not bound down by fixed forms. A F., however, is not shapeless; it generally consists of sev. sections, each being independent of the others in form. Frequently one section interrupts a previous one, and often a brilliant cadenza is used; but the whole is united. An example of this is to be seen in Mozart's F. in C minor. The student of music should examine variants in the F.s by Mozart, Mendelssohn, and Schumann. See also **FANTASY**.

Fantasy, or **Fancy**, in music an Eng. instrumental form, cultivated in Elizabethan and Stuart times, and later practised as a kind of archaic exercise by Purcell. It is an earlier variant of the fantasia (q.v.), but differs from it in being polyphonic in texture and as a rule chamber music written for consorts of viols or 'broken consorts' of mixed string and wind instruments, though F.s for keyboard instruments also exist. There is usually a strictly fugal opening, after which the polyphony is more freely handled. See also **IN NOMINE**.

Fanti, a negro tribe inhabiting Ghana, W. Africa. In the early 19th cent. the F. were subjugated by the Ashanti, a people belonging to the same stock as themselves. They fought on the side of the Brit. in the Ashanti war (1873-4), but although of strong physique proved cowardly allies. See A. B. Ellis, *The Tshi-speaking People of the Gold Coast*, 1887; and Sir H. Brackenbury and G. Huyshé, *Fanti and Ashanti*, 1873.

Fantin-Latour, **Ignace Henri Jean Théodore** (1836-1904), Fr. artist, b. Grenoble, the son of a pastel painter. He studied under Couture, and first exhibited in the Salon in 1861. He moved in the artistic circles of Paris and London, and numbered among his friends Corot, Delacroix, Courbet, and Whistler (qq.v.). His 'Hommage à Delacroix' is a portrait group containing Whistler, Baudelaire, Legros, Champfleury, and himself. His other notable portrait groups are 'Un Atelier à Batignolles,' 1870, 'Un coin de table,' 1872, and 'Autour du Piano,' 1885. He also exhibited some fine lithographs, and some beautiful paintings of still life. See lives by G. Hédard, 1906; A. Julien, 1909; G. Kahn, 1926.

Fantoccini, see **MARIONETTES**.

Fanu, **Joseph Sheridan Le**, see **LE FANU**.

Fanum Fortunae, see FANO.

Fanum Voltumnae, see MONTEFIASCONE.

Far East, Russian, comprises the Maritime and Khabarovsk Krays and the Chita, Amur, Magadan, Kamohatka, and Sakhalin Oblasts of the Russian Federal Rep. It was annexed by Russia gradually between 1649 and 1875, parts being temporarily lost to Japan; its present frontiers have existed since 1945. The area is rich in natural resources, but sparsely populated. The inhab. are mostly Russian and Ukrainian colonists. Indigenous Tungus and Paleo-Asiatic (q.v.) peoples are almost extinct or assimilated. Before 1938-45 there was also a considerable Japanese, Korean, and Chinese pop., now expelled or deported. In the early 20th cent. the F. E. colonists developed strong regional tendencies which found partial expression in the creation of the F. E. Rep. (q.v.) and the somewhat special position of the F. E. ter. in 1926-38. It is an area of banishment and labour camps and important development projects. See also DAL'STOY; W. Kolarz, *The Peoples of the Soviet Far East*, 1954.

Far East Campaigns in Second World War, see PACIFIC CAMPAIGNS.

Far Eastern Republic, ephemeral 'buffer' state between Soviet Russia and Japan which existed in the Russian Far East, 1920-2. Formally an independent democratic rep., it was in fact one of the first 'people's democracies' dominated by Communists. It was annexed to Soviet Russia after the Japanese left Vladivostok.

Farad, unit of capacitance (q.v.), i.e. the capacitance of a conductor charged to 1 volt by 1 coulomb. In practice the subdivision microfarad, $\mu F = 10^{-6}$ farad, or $pF = 10^{-12}$ farad (picofarad), is used. The name derives from Faraday (q.v.). See UNITS, ELECTRICAL.

Faraday, Michael (1791-1867), distinguished natural philosopher, chemist, and electrician, b. at Newington Butts, near London, his father being a blacksmith. He was early apprenticed to a bookbinder, but all his spare time was devoted to scientific reading and experiment to the best of his opportunities. He managed to attend some lectures by Sir Humphry Davy, and in 1813 the great scientist acceded to his requests and made him an assistant in the laboratory of the Royal Institution. He then travelled for some time with Davy on the Continent, and on his return devoted himself to chem., in which study he greatly assisted Davy in many ways. In 1832 he was made D.C.L. In 1833 he succeeded his benefactor as Fullerian prof. of chem. in the Royal Institution. From this period he continued his work not only on chem., but also on the manuf. of glass for optical purposes, and the study of electricity and magnetism. Perhaps his greatest discovery was the principle of the dynamo, that a current can be induced in an electrical circuit by moving it relative to a magnetic field. Among his other numerous discoveries may be named those

of the condensation of gases into liquids by pressure (1823), the decomposition of hydrocarbons by expansion (1827), electro-chemical decomposition (1834), magnetic rotary polarisation (1845), and various later researches in connection with diamagnetism. In 1829 he commenced a series of Christmas lectures at the Royal Institution, which were primarily addressed to young people. They found, however, a much wider audience. F.'s pubs. are numerous, the most important being: *Chemical Manipulation*, 1827 (2nd ed. 1842); *Experimental*



National Portrait Gallery

MICHAEL FARADAY

A painting by Thomas Phillips

Researches in Electricity, 1844-7; *Lectures on the Non-metallic Elements*, and *Lectures on the Chemical History of a Candle*, 1861. See J. Tyndall, *Faraday as Discoverer*, 1868; B. Jones, *The Life and Letters of Faraday*, 1870; and lives by J. H. Gladstone, 1872; W. Jerrold, 1891; S. P. Thompson, 1898; W. Ostwald, 1924.

Faraday's Laws, see ELECTROLYSIS.

Faradisation, application for medical purposes of a faradic current of electricity. Whereas a galvanic current is continuous, a faradic current is interrupted, the interruptions occurring regularly. Both kinds are used diagnostically and therapeutically; in the former case faradism being used for the diagnosis of nervous and muscular disorders, in the latter in cases of general exhaustion, acute articular rheumatism, etc.

Farazi, Muslim sect formed in Bengal during the 19th cent. to check the abuses into which the Muslim world had fallen. Its adherents base their doctrines and rules of life solely on the Koran.

Farazdaq, Al- (nickname; real name Hammām ibn Ghaliḥ) (c. 641-c. 728), Arabic poet, b. Basra. His nickname means The Fat. His writings are chiefly satirical—written against people in Basra. He had to flee—first to Kufa, then to Medina, whence he was expelled by the Khalīf for licentiousness. He was permitted to return to Basra, where he d.

Farce (It. *farsa*, from Lat. *farcire*, to stuff), form of dramatic art which makes no pretence of holding the mirror up to nature, aiming at exciting laughter by means of absurd situations and extravagant buffoonery. While the province of comedy is to reveal the humorous interplay of character upon character, and that of burlesque is to caricature some particular fashion, style, or human type, the object of F. is solely to amuse. Rude pantomimes and F.s prevailed in very early times among the Greeks and Romans. F. exists in the primitive drama of all nations. *Gammer Gurton's Needle* is an early form of Eng. F. In the hands of Shakespeare, F. developed into true comedy.

Farciennes, tn in the prov. of Hainaut, Belgium, 6 m. E. of Charleroi, with coal and metal industries. Pop. 11,300.

Farcy, outward manifestation of glanders, a contagious disease that attacks horses. It takes the form of ulcers or F. buds which appear on the limbs. See HORSE (DISEASES).

Farham, mrkt tn of Hants, England, 5 m. NW. of Portsmouth. The industries include shipbuilding, and the manuf. of bricks, earthenware, leather, and ropes. There is a flourishing trade in corn and timber. Pop. 44,740 (1954).

Faré, Guillaume (1489-1565), Fr. reformer, b. near Gap in Dauphiné, France; studied in Paris, where he was converted from an ardent Catholic into an equally ardent Protestant. He preached with fervour throughout France and Switzerland and made many converts. His friend Calvin was the organiser, while he was the preacher, of the Genevan Church (1535-8) until the 2 reformers were expelled from the city. He wrote some polemical works on purgatory (1534) and the Lord's Supper (1555). See lives by Ancillon, 1691, and F. Bevan, 1893.

Farwell Cape, see KAP FARVEL.

Fargo, largest city of N. Dakota, U.S.A., cap. of Cass co., on the Red R. of the N. It is the seat of the N. Dakota Agric. College, Oak Grove Seminary, and Concordia Conservatory of Music, and is a busy grain-trading centre and distribution point for farm implements. It manufs. luggage, electrical apparatus, fur coats, and steel, wool, and glass products. Pop. 38,255.

Faria y Sousa, Manuel de (1590-1649), Portuguese historian and poet. The work of his life was a compilation of a hist. of the Portuguese in all parts of the world;

but it was never completed, although sev. vols. appeared after his death: *Europa Portuguesa* (3 vols.), *Asia Portuguesa* (3 vols.), *Africa Portuguesa*. His sonnets and eclogues are mostly contained in *Noches claras* (Madrid), 1624-6; and the *Fuente de Aganipe*.

Faribault, city, co. seat of Rice co., Minnesota, U.S.A., on the Cannon R., 45 m. S. of St Paul, in grain and livestock area. It manufs. food products, foundry products, and agric. and household equipment. Minnesota School for the Blind, School for the Deaf, and School for the Feeble-Minded are here. Pop. 16,000.

Farid ud-Din 'Attar, Persian mystic and religious poet of the last half of the 12th and beginning of the 13th cent. AD. There is no certainty as to the precise period of his life. He wrote *Maniq' ut-Tayr*; i.e. Language of the Birds—a long, mystical and allegorical poem. The Shi'ite tendencies of his *Madhar ul-'Ajd'ib* (Manifestation of Wonders) caused his expulsion from Nishapur. He afterwards lived chiefly in Mecca. He also wrote the *Pand-nama* (Book of Counsels), the *Tadhkirat ul-Awliya* (Memoirs of Saints), and many other works. F. is said to have perished in the invasion of Persia by the Mongols.

Faridun, or Feridoun, in Persian legend, an Iranian king, one of the chief heroes of the Shahnamah. He was the son of Abtin and Firanak, and the story goes that on his birth he was sought out by Tohak, whom he was destined to dethrone. Abtin was killed, but Firanak escaped with F. and reared him in Mt Alburz, and when he grew up he overthrew Tohak, captured his cap. on the Tigris, and ruled long and prosperously.

Farigoule, Louis, see ROMAINS, JULES.

Farina, Johann Maria, inventor of the celebrated perfume, Eau de Cologne (q.v.).

Farina, Salvatore (1846-1918), It. novelist, b. Sardinia. He began by studying law, but afterwards devoted himself to literary work and settled at Milan. His many books, very popular at the time, are written in a simple style, remarkable for their sentimental humour (in this F. has been compared with Dickens) and their cunning irony. His best works are *Mio Fidio*, 1879-82, and *Il Signor Io*, 1880.

Farinacci, Roberto (1893-1945), It. politician, b. Cremona. He was a railway worker; he joined the Fascist movement in its early days and created a strong Fascist party in Cremona. In 1924 he was made secretary of the Fascist party and soon exceeded his predecessors in violence. For 2 years he ran the political machine of the Fascist party and then was suddenly dropped for no stated reason; but after 2 years' exile from power he was brought back into active life by being made a minister of state. In his newspaper, the *Regime Fascista*, he became one of the best-known Fascist publicists, adopting an extreme pro-Nazi attitude. A strong supporter of imperial expansion, he volunteered for service in Abyssinia and fought through part of a campaign.

In the Second World War he fought in Albania as commander of the Blackshirt battalion. He escaped the purge of the Fascists and remained one of Mussolini's most fanatical supporters, but was executed in 1945 following the defeat of the Ger. armies in Italy.

Farinaceous Foods are those which contain starch. The word 'farina' means literally meal or flour formed from grain, when ground, and consists, therefore, of starch, gluten, etc.; but it is generally applied to the farinaceous matter contained in vegetable products, such as the potato, when it consists almost entirely of starch or fecula, or beans and peas, etc. Among the many F. F., sago, arrowroot, and tapioca are types of the large class of dried foods which are imported into the country, and these consist practically of pure starch and are very nutritious when cooked with milk. Maize, too, used for making corn bread in America, has very considerable nutritive qualities, since it contains more carbon and nitrogen than is found in an equal weight of wheat flour, besides a considerable quantity of free hydrogen, which is found in the fat, a substance in which the grain is rich. Besides this, it exceeds all other grains in point of economy. It is used in Ireland and very widely in America. F. F. give heat and energy to the body, but are not flesh formers, although very often an excess of such foods is stored up as fat.

Farinati, Paolo (c. 1522-1606), It. painter of the family of the Uberti, b. Verona. He was a pupil of Niccolò Giolfinò and A. Badile, but studied also the works of Parmigiano. He formed his style partly on Titian and Giorgione, although in colouring he is inferior to both, but in form he learned more from the works of Giulio Romano. Of his pictures 'The Miracle of the Loaves and Fishes' (S. Giorgio, Verona) is generally considered to be his best. His other notable works are: 'Presentation in the Temple' (Berlin); 'The Marriage of St Catherine,' 'The Massacre of the Innocents' (Verona).

Farinelli (1705-82), Neapolitan male soprano singer of great eminence, whose real name was Carlo Broschi, b. Andria. He studied under Porpora, and went from Rome to Vienna, which he visited 3 times between 1724 and 1731. In 1734 he came to England, and so delighted his audiences with his singing that Handel was obliged to dismiss a rival company over which he presided. From England he went to Spain, where he remained 25 years, and was much appreciated by Philip V and his son Ferdinand VI, both of whom suffered from chronic melancholia. In 1759 he retired to Bologna, where he d.

Farington ('fern hill'), or **Great Farington**, mkt tn in the Abingdon parli. div. of Berkshire, England. It has trade in corn, sheep, and cattle, and is interesting for its church of All Saints, a large cruciform building of the Early Eng. period, and for Farington House, built by Henry James Pye (1745-1813), the poet. Pop. 3287 (1954).

Farington, Joseph (1747-1821), artist and diarist. He executed many engravings of scenes in the Eng. Lake Dist. His diary, of great value in its account of the art world of his day, was first pub. in 1921-2.

Farini, Luigi Carlo (1812-66), It. statesman and historian, b. Russi, near Ravenna. He was banished from the papal states because of his political opinions, and became an ardent supporter of Cavour (q.v.), who in 1859 sent F. to negotiate the transfer of Modena, Parma, and Tuscany to Piedmont. In 1861 he became minister of the interior in the last ministry of Cavour, and was himself premier, 1862-3. His chief pub. was *Lo Stato Romano dal 1815 al 1860* (4 vols.) 1851, partly trans. by Gladstone. See his letters to Gladstone in *Mémoires sur les Affaires d'Italie*, 1859; *Lettres sur les Affaires d'Italie* (Paris) 1860; and life by E. Parri, 1878.

Farjeon, Herbert (1887-1945), critic and playwright, b. London. Educ. at Univ. College School, he became dramatic critic for sev. papers in succession, including the *Sunday Pictorial*, *Sphere*, and *Graphic*. His plays include *Friends*, 1917, *Picnic*, 1927, *Many Happy Returns*, 1928, *Why Not To-night?* 1934, *Spread It Abroad*, 1936, *Nine Sharp*, 1938, *Rig Top*, 1942, and (in collaboration with his sister Eleanor) *The Two Rouquets*, 1936, and *The Glass Slipper*, 1944. With his sister he also wrote *Kings and Queens*, 1932, a child's rhyming hist. of England.

Farm (Fr. *ferme*, from medieval Lat. *firma*, fixed payment), term used to denote a piece of land let or rented for cultivation or pasturage, together with the necessary buildings. In Britain about half the farmers rent their land and half own it. In America the farmer generally owns the land he cultivates.

Farm holdings consist of the residence for the farmer, cottages for the F. labourers, the F. steading, and the F. land itself. An important feature of farming in this country is a great diversity in the size of individual holdings. Whereas at one extreme 5 per cent of the land is shared between one-third of the farmers, at the other extreme less than 5 per cent of the farmers F. more than one-quarter of the land. Thus almost three-quarters of the holdings over 5 ac. in size are less than 100 ac. In the interest of domestic peace and happiness the F. house should be appropriate to the size and quality of the F. The typical F. dwelling-house on holdings of 200 ac. or more is large and comfortable, though lacking in external appeal. Ideally it overlooks the F.-stead and is adjacent to it. *Farm cottages* should be, if possible, within easy reach of the farm. Grants are available from local authorities for the approved construction or improvement of cottages. Whilst housing is short it may be necessary to allocate the cottages near the steading to those tending the live-stock, tractor drivers, etc., perhaps living in the local vil. The *farm steading* is the term used to denote the buildings, etc., used for storing crops and housing stock and

machinery. The type and extent of the buildings will depend on the size of the holding, the system of farming pursued, and the resources or fancies of the owner. The site of the steading is important in the efficient running of the F., and the best place is at the centre of the holding on free draining land but with a good water supply. It is also advantageous to be near a good hard road as F. lanes are notoriously difficult to maintain. A common layout has the buildings on 3 sides of

partments of the steading to be under one roof, often in 2 storeys.

In Britain to-day many cottages are out of date and F. buildings still more so. In many cases buildings were constructed to meet needs which have now passed or changed in character and importance. Thus in some cases it will be found that the large barn was really designed for the use of the flail. The increasing use of electricity and internal combustion engines in old wooden and thatched build-

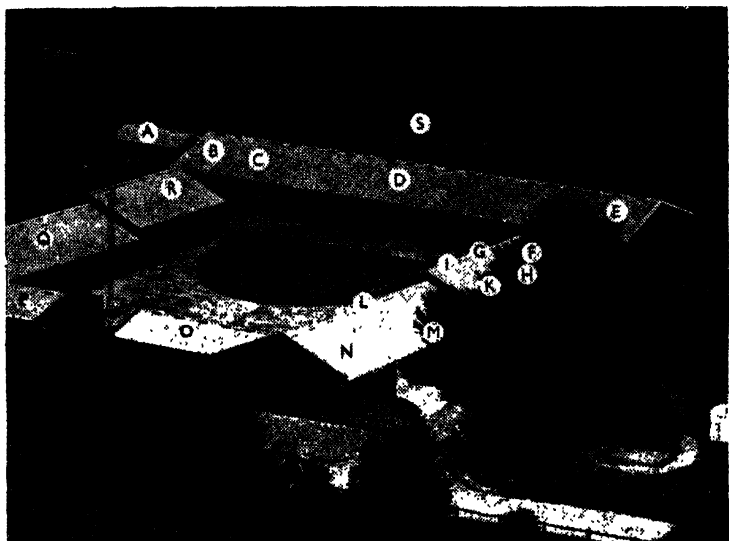


Photo by Airscenes and Frank H. Meads, Essendon: by courtesy of Brig. W. H. Crosland, C.B.E., D.S.O., T.D., D.L., J.P.

A NEW FARM AT LITTLE BERKHAMSTED, HERTFORDSHIRE

A, Bull boxes and yards; B, calf pens; C, mixing room; D, cowhouse; E, dairy and sterilising room; F, office and staff room; G, foaling box; H, saddle room; I, calving box; K, stable; L, loose boxes; M, tractor shed; N, tool room; O, implements; P, implements; Q, stock pens and cattle shelters; R, granary; S, silos. Built by George W. King Ltd., Hitchin (architect, L. A. Hartless).

a square with the open side facing S. For economy in labour use, straw and hay bams, stores, etc., should be near to the point of utilisation of their contents and should be easily accessible from good F. roads.

Construction.—Existing buildings are often of very solid stone construction with poor ventilation and lighting; frequently they are very old. The modern tendency in Britain is towards less permanent structures, with steel or pre-cast concrete frames and walls, and roofs of concrete blocks and asbestos or iron sheeting. In America F. buildings are generally of wood. It is common there for all com-

ings introduces a serious fire hazard. When labour was cheap little attention was paid to economy in its use, but now farmers cannot afford the time wasted in carrying sacks of corn and fertilisers long distances on men's backs. Tractor machinery, combine harvesters, etc., are much bigger and heavier than the old horse machinery and may make existing implement sheds inadequate. Also between the 2 world wars many cow-houses and piggeries were erected with little attention to design, and these do not come up to present production standards. The problem is to replace these buildings or adapt them to modern requirements.

In some cases replacement is the procedure adopted. For example, many progressive milk farmers, in order to economise in labour, prefer to have a small milking parlour, in which the cows are merely milked, combined with covered yards where the cows lie in and are fed. In adapting old buildings use can be made of time and motion study to cut down wastage in labour use. When planning new buildings consideration must be given to cost, adaptability, durability, simplicity of erection, economy of maintenance, possible changes in farming methods, place in the general layout, animal health, comfort and economy of labour, and last but not least appearance.

The farm land is best arranged round the steading within a ring fence, i.e. with fields isolated from the main block of land. The fields should be rectangular or square. For arable cropping large fields are desirable, but if livestock is to be grazed smaller units are better. The provision of good fences, hedges, roads, and ditches is obviously a matter of great importance.

See M. E. Seeborn, *The Evolution of the English Farm*, 1927; F. Sykes, *This Farming Business*, 1944; E. Gunn, *Farm Buildings—New and Adapted*, 1945; H.M.S.O., *Farm Buildings*, 1952. See also AGRICULTURE; DAIRYING; GARDENING.

Farm Management. In the U.S.A. it was soon recognised that, to be successful, the farmer had not only to be an artist in husbandry but also a businessman. This was particularly important on the vast corn farms and ranches. Chairs in the subject were estab. in various univs. early in the 20th cent. Recently the importance of F. M. has been appreciated in Britain, and the subject is already being taught at univ. level, e.g. at Reading. Students are instructed in the most profitable methods of producing crops and livestock; the effects of soil and climate on farming; the use of capital; problems of labour use and mechanisation; simple accounting and book-keeping; and the marketing of produce. See K. W. Campbell, *Farm Management*, 1940; H.M.S.O., *Principles of Good Farm Management*, 1955; H.M.S.O., *The Farm as a Business*, 1955; J. Scott Watson and J. More, *Agriculture: The Science and Practice of British Farming*, 1956; and also reports from the various univ. agric. economics depts.

Farman, Henry (1874–), Anglo-Fr. aviator, b. Cambrai. After learning to fly in a Voisin machine in 1907 and winning many honours, he built (1909) the aircraft called after him which did more than any other to popularise practical flying in Europe. Although not the inventor of the alleron, he was the first to incorporate it in the practical form in which it is still used.

Farmer, Richard (1735–97), scholar, b. Leicester. He was educ. at Cambridge, where he ultimately became Master of Emmanuel College. He wrote an *Essay on the Learning of Shakespeare*, 1767, in which he maintained that Shakespeare's

knowledge of the classics was got through trans.; it is a work of great ability. F. was a clergyman, a D.D., and a prebendary of St Paul's.

Farmers' Clubs exist for the twofold purpose of furthering agric. interests and promoting social intercourse among men who are following the same agric. occupation. Meetings take place usually on market days, in most of the big agric. centres throughout the country. The Farmers' Club, estab. at 2 Whitehall Court, London, S.W.1, has a large membership of farmers, stockbreeders, landowners, and other persons interested in agriculture. It was estab. in 1843 at the instance of sev. members of the Royal Agric. Society of England and the Smithfield Club. Meetings are held annually there, when papers are read on current agric. subjects and on legislation affecting agriculture. The National Federation of Young Farmers' Clubs has its H.Q. at 55 Gower Street, London, W.C.1, where is pub. the monthly paper *The Young Farmer*. The first of the Young Farmers' Clubs was estab. by the United Dairies in Jan. 1921 at Hemycok, Devon, and attracted the interest of Lord Northcliffe, who set aside a section of the Ideal Homes Exhibition at Olympia for their show in 1922, and offered a gold cup for competition among the young farmers of America and of Britain. Later the Ministry of Agriculture interested itself in clubs in which each young farmer personally rears his own stock. F. C. are a feature in the U.S.A., and of Canada, especially in the 3 prairie provs. of the dominion. There are also in the U.S.A. a number of boys' and girls' clubs in connection with agric. extension work. In America, experimentation, improvement in marketing, discussion of anti-pest methods, and the organisation of co-operative marketing are all prominent activities in F. C., while demonstrations in educational work and agric. competitions are periodically organised for the common benefit of members.

Farmers-General, those individuals who sought from the state or controller of taxes the privilege of collecting the taxes in return for a certain fixed sum paid into the treasury, such as the 'publicani' of classical and N.T. times. The system of *fermiers-généralx* was very prevalent in France before the Revolution of 1789. It was largely responsible for the Revolution, and was swept away in it.

Farmers-General (Ancient Rome), see PUBLICANI.

Farnaby, Giles (c. 1565–c. 1640), composer. He lived in London, where he married in 1587, and took the B. Mus. at Oxford in 1592. He composed canzonets (madrigals), a setting of the Psalms for 4 voices, and over 50 virginal pieces.

Farnaby, or Farnable, Thomas (c. 1575–1647), grammarian and schoolmaster, the son of a London carpenter. He was educ. at Merton College, Oxford, and at a Jesuit College in Spain. His school in Goldsmith's Rent, London, became famous all over Europe. As the chief

classical scholar and schoolmaster of his time, he prepared a new Lat. grammar and an annotated ed. of most of the great classical authors. These elaborately annotated eds. were extraordinarily popular throughout the 17th cent. Ben Jonson (q.v.) was a friend of F. and contributed commendatory Lat. elegiacs to his ed. of *Juvenal* and *Perseus*. John Owen eulogises F.'s Seneca in his 'Epigrams.'

Farnborough, Baron, see MAY, SIR T.

Farnborough, urb. dist. and par. of Hants, England, situated in the Aldershot parl. div., 2½ m. N. of Aldershot, and 32 m. SW. of London. Part of the Aldershot camp is in the par., and also the Royal Aircraft Estab., the country's chief centre of scientific research and experimental development in aeronautics, together with the Empire Test Pilots School and the Institution of Aviation Medicine. The remains of Napoleon III and the Prince Imperial are buried in a mausoleum built by the ex-Empress Eugénie at F. Hill. There is a Benedictine community at the Abbey of St Michael in F. Pop. 28,420.

Farne Isles, group of 26 small basaltic islets and rocks in the North Sea, almost 2 m. from the mainland and forming part of Belford rural dist. in Northumberland, England. On Longstone is. stands the lighthouse from which Grace Darling's heroic rescue took place in 1838. Inner F. was for a time the residence of St Cuthbert, who returned to it to die in 687; after him a succession of hermits occupied the is. From 1255 to 1536 the House of F. was a monastic house comprising 2 Benedictine monks. There were 2 chapels, that to St Cuthbert having been restored. On the probable site of his Oratory stands a 16th-cent. tower now used as a study centre. The group is famous as a bird sanctuary, particularly for guillemots, and as the only breeding station of Atlantic seals on the E. coast of Britain. The is. were acquired by the National Trust in 1925, as a result of a public appeal.

Farnese Family, The, powerful It. family whose early hist. is obscure. Its importance dates from 1534, when Cardinal Alessandro Farnese was elected pope as Paul III. He obtained (1545) the duchy of Parma and Piacenza for his natural son Pierluigi Farnese. Piacenza was occupied by Charles V in 1547, but the duchy of Parma was ruled by the F. for over 2 centuries. *Alessandro Farnese* (1545-92), the 3rd duke of Parma, was a famous statesman and gen., and became governor-gen. of the Netherlands under Philip II of Spain. His son and successor, *Ranuccio I* (1569-1622), instituted the savage persecutions against supposed 'witches' and 'heretics.' He was succeeded by his 2nd son, *Odoardo* (1612-46), who quarrelled with Pope Urban VIII about the possession of Castro, which was eventually razed to the ground during the reign of his son *Ranuccio II* (1630-84). *Ranuccio's* 2 sons, *Francesco Maria* (1678-1727) and *Antonio* (1678-1731), both d. childless and

were the last of the male line of the F. The duchy of Parma passed to Don Carlos of Bourbon, son of Philip V of Spain and *Elisabeth Farnese* (1692-1766).

Farnese Palace, palace in Rome (q.v.), on the Piazza F., one of the finest specimens of Rom. Renaissance architecture. It was begun on the order of Cardinal Alessandro F. (later Pope Paul III, q.v.) in 1514, and was completed under the direction of Michelangelo (q.v.). It was inherited by Don Carlos of Bourbon (see FARNSESE FAMILY), later Charles III (q.v.) of Spain, and most of its pictures and antique sculpture were removed to Naples. It now houses the Fr. embassy to Italy.

Farnham, mrkt tn of Surrey, England, situated on the R. Wey, 38 m. SW. of London. It is the centre of a hwp dist. Wm Cobbett was b. here in 1762, and is buried in the par. churchyard. F. is historically interesting. Its castle was built by Henry of Blois, brother of King Stephen, destroyed by Henry III, and rebuilt and garrisoned by Charles I. It was restored in 1684 by Dr Morley, bishop of Winchester. The ruined keep was repaired in 1913-14. Moor Park was the last retreat of Sir Wm Temple, who d. here on 27 Jan. 1699, and it was here that Dean Swift wrote many of his works. The cottage in which Miss Johnson lived is still called *Stella's Cottage*. Mother Ludlam's and Foot's caves are near by, also the remains of earth-works called *Caesar's Camp*. Many Rom. coins have been found. Pop. 24,100 (1954).

Farnol, John Jeffrey (1878-1952), novelist, b. Aston, Warwickshire. He studied art and for 2 years worked as a scene painter at the Astor Theatre, New York. His novel, *The Broad Highway*, 1910, a picaresque romance, was so successful that he was able to return to England and make writing his career. *The Amateur Gentleman*, 1913, *The Chronicles of the Imp*, 1915, and *Our Admirable Betty*, 1918, were also very popular. Others of his flamboyant novels are *Beltane the Smith*, 1915, *The Geste of Duke Jocelyn*, 1919, *Peregrine's Progress*, 1922, *The Loring Mystery*, 1925, *Charmian*, *Lady Vihar*, 1932, and *My Lord of Wrybourn*, 1948.

Farnworth, bor. and tn of Lancs, England, 3 m. SE. of Bolton and 9 m. NW. of Manchester, in the heart of the S. Lancs industrial area, forming the parl. constituency of F. Local industries include the weaving and finishing of textiles, manuf. of hosiery and knitted goods, engineering and printing, bleaching and dyeing works. Pop. (1954) 28,614.

Faro: 1. Dist. of S. Portugal, co-extensive with Algarve prov. (q.v.).

2. Most southerly city of Portugal, cap. of F. dist. and of Algarve prov., 135 m. SSE. of Lisbon (q.v.). It is near Cape Santa Maria, on an inlet of the Atlantic, behind 3 is. The city was taken from the Moors by Alfonso III in 1249, it was burned by the Eng. in 1596, and it was severely damaged in earthquakes in 1782 and 1755. The tn walls are probably

Moorish, and there is a cathedral with a fine 18th-cent. tower. Cork and fruit are exported, there are tunny and sardine fisheries, and there are manufs. of food-stuffs. Pop. 20,000.

Faro (from 'Pharaoh,' picture of an anet Egyptian king on one of the cards of the old Fr. pack), a game of hazard with a full pack of cards, popular in France in the reign of Louis XIV and still in the U.S.A. The 'bank' is held against an indefinite number of players.

Faroe Islands, see FAEROE.

Farquhar, George (1678-1707), dramatist, b. Londonderry. He went on the stage after leaving Trinity College, Dublin, and in that city, about 1695, made his debut as Othello. He is generally supposed (on the authority of his biographer, Thomas Wilkes) to have left college in 1695 on account of the death of his patron, Bishop Wiseman of Dromore, to become a corrector of the press. In a subsequent appearance he accidentally stabbed a fellow-actor, and was so distressed that he retired from the stage, on which in any case he had met with little success. He now turned his thoughts to play-writing, and his *Love and a Bottle* was successfully produced at Drury Lane in 1699. In the following year *The Constant Couple* was performed, and was an even greater success. This was followed by *Sir Harry Wildair*, 1701, in which play at his own benefit at Dublin he played the title-rôle, *The Inconstant*, or *The Way to Win Him*, 1702, *The Twin Rivals*, 1702, and *The Stage Coach*, a farce in 1 act (with Motteux), 1704. His last plays were *The Recruiting Officer*, 1706, and *The Beau's Stratagem*, 1707, which are marked by a good-humoured realism different from the usual artificiality and cynicism of Restoration comedy. He got into financial difficulties and the duke of Ormonde, whom he styles his 'general' in the dedication to *The Recruiting Officer*, advised him to sell the lieutenant's commission which he then held, in order to pay his debts, promising to give him a captaincy. He acted on this advice, but the duke failed him and F. sickened and d. in despair. He belonged to the Congreve school of dramatists, with qualities of wit and gaiety, but little more sense of morality than the majority of the playwrights of his time. His *Complete Works* were ed. by C. Stonehill, 1930. See W. Connely, *Young George Farquhar*, 1948.

Farquharson, Martha, see CHILDREN'S BOOKS.

Farragut, David Glasgow (1801-70), first adm. of the U.S.A. navy, b. at Campbell's Station, near Knoxville in Tennessee. He entered the navy in 1810, became lieutenant in 1825, commander in 1841, and captain in 1855. Although a southerner by birth, on the outbreak of the Civil war in 1861 he adhered to his allegiance to the gov. at Washington, and in 1862 was appointed as rear-adm. to the command of the W. Gulf Blockading Squadron, with which he forced the g. of the Mississippi and captured Orleans. In 1864 he captured

Mobile and in the same year was invested with the newly created rank of vice-adm. He was made adm. in 1866. In 1867 he was chosen to command the European Squadron. The cruise came to an end on 10 Nov. 1868.

Farrant, Richard (1-1581), composer of church music. He became a gentleman of the Chapel Royal under Edward VI; became organist of St George's Chapel in 1564, and rejoined the Chapel Royal in 1569, retaining the Windsor post. Of his church music only a Cathedral Service in A minor and 2 anthems are preserved and can be attributed to him with certainty.

Farrar, Frederic William (1831-1903), divine, b. Bombay, and educ. at London Univ. and Trinity College, Cambridge. From 1855 to 1870 he was assistant master at Harrow, and from 1871 to 1876 headmaster of Marlborough College. He was elected fellow of the Royal Society in 1866, univ. preacher in 1868, honorary chaplain to the queen in 1869, and Hulsean lecturer in 1870. He became canon of Westminster and rector of St Margaret's in 1876, archdeacon in 1883, and dean of Canterbury in 1895. In 1858 he began his literary work with the schoolboy story, *Eric, or Little by Little*, followed by *Julian Home*, 1860, and *St Winifred's*, 1862. He pub. a number of books on classical and modern philology, but it was by his theological writings that he attained his greatest popularity. *The Witness of History to Christ* (Hulsean Lectures) appeared in 1871. Other works include: *The Life of Christ*, 1874 (12th ed. 1875), *Life of St Paul*, 1879, *Early Days of Christianity*, 1882, *Lives of the Fathers*, 1888, *Darkness and Dawn*, 1891, and *The Bible, its Meaning and Supremacy*, 1896.

Farrar, Geraldine (1882-), Amer. operatic soprano, b. Melrose, Massachusetts. She studied singing with Mrs J. H. Long in Boston, Mme Thursby in New York, Trabaddello in Paris, and Lilli Lehmann in Berlin. On 15 Oct. 1901 she made her debut at the Royal Opera, Berlin, as Marguerite in Gounod's *Faust*, with such success that she immediately had a 3 years' contract. From 1906 till her retirement from the stage on 22 April 1922, she was a leading soprano at the Metropolitan Opera House, New York.

Farrell, James Thomas (1904-), Amer. novelist and critic, b. Chicago. Educ. at Chicago Univ., he worked for a time in a petrol station and as a salesman, and in 1936 obtained a Guggenheim fellowship. His experiences as a baseball enthusiast and as a student in Catholic schools on the S. side of Chicago are the background of his novel *Young Lonigan*, 1932. This was followed by *Gas House McGinty*, 1933, and the trilogy *Studs Lonigan*, 1925, for which he was awarded \$2500 from the Book of the Month Club. Other novels are *No Star is Lost*, 1938, *Father and Son*, 1940, *My Days of Anger*, 1943, *Bernard Clare*, 1946, *The Road Between*, 1949, and *The Face of Time*, 1953. He also pub. sev. vols. of short stories. He has made a detailed and constant use of the naturalistic technique, especially in his chief book,

Studs Lonigan. His characters live in the depressed areas of the S. side of Chicago and among street gangs and petty criminals. Most of them are casual in their morality and many merely vicious. His writing shows the influence of James Joyce, Dreiser, and Proust, but he reveals his keen interest in the ordinary facts of modern Amer. life and his impatience with social and economic inequalities. Others of his works are *A Note on Literary Criticism*, 1936, and *Literature and Morality*, 1947.

Farrell, bor. in Mercer co., Pennsylvania, U.S.A., on the Shenango R., close to Sharon city, with which it is industrially conjoined. It has steel and tin-plate manufs. Pop. 13,640. The name has been changed from Sharon since 1910.

Farren, Elizabeth, Countess of Derby (c. 1759-1829), actress, and daughter of George F., an actor. She made her first appearance in London at the Haymarket in 1777, as Miss Hardcastle in *She Stoops to Conquer*. This success was followed by Rosina in Colman's adaptation of *The Spanish Barber*, and many others. In 1782 she succeeded Mrs Abingdon at Drury Lane. In 1797 she married Edward, 12th earl of Derby.

Farren, Ellen, commonly known as **Nellie Farren** (1848-1904), actress, came of an old theatrical stock, and made her first appearance on the stage at the age of 5. She played many parts at Sadler's Wells, the Victoria, and the Olympic theatres, and earned the reputation of being both clever and versatile. When she went to the Gaiety in 1868 and played prin. boy parts in burlesque she became famous. She was a great 'draw' in London until 1891, when ill-health compelled her retirement.

Farrer, Sir Thomas Henry, 1st Baron (1819-99), statistician and civil servant, b. London, and educ. at Eton and Balliol College, Oxford. He was called to the Bar in 1844, but ceased to practise on entering the civil service as secretary to the Marine Dept of the Board of Trade in 1850, a post which he held until 1886. He was an advanced Liberal in politics, and a strict free-trader. His theories on trade and finance are embodied in his writings: *The State in its Relation to Trade*, 1883, *Free Trade versus Fair Trade*, 1886; and his letters and essays appeared in *The Times* and *Contemporary Review*. He pub. *Study in Currency* in 1898. He was created a baronet in 1883 and a baron in 1893.

Farrer, William James (1845-1906), agric. scientist, b. Kendal, England, migrated to Australia 1870. F. for some time acted as surveyor for the lands dept of New South Wales; later he bought land and, becoming interested in the problem of breeding a rust-resistant wheat, he began a series of experiments which were largely successful in developing drought and disease resistant wheats suitable for Australian climatic conditions. See A. Russell, *W. J. Farrer*, 1949.

Farriery, art of horse-shoeing. It is of anct origin, and there is evidence that the

art was practised by the Celts. It does not seem to have been in use among the Greeks or Romans. The art probably came into general use after the overthrow of the W. empire towards the close of the 5th cent. In modern times the art has undergone many changes and improvements, as the methods formerly adopted were considered injurious to the animal and a source of considerable loss to the owner. The following were some of the chief causes of these evils: (1) paring the sole and frog; (2) applying shoes which were too heavy and of the wrong shape; (3) using too many and too large nails; (4) applying shoes too small and removing the wall of the foot to make the feet fit them; (5) rasping the front or wall of the hoof. These were often due to lack of skill on the part of workmen who combined the duties of blacksmith and shoemaker in one trade, and who lacked the necessary basic knowledge of the anatomy and function of the horse's foot. According to modern principles, (1) shoes should be as light as compatible with the wear required of them; (2) the ground face of the shoe should be concave, and the face applied to the foot plain; (3) heavy draught horses alone should have toe and heel calks on their shoes to increase the foothold; (4) any excess of growth of the wall or outer portion of horny matter should only be removed in re-shoeing. Care is to be taken to keep both sides of the hoof of equal height; (5) the shoes should fit accurately to the circumference of the hoof and project slightly beyond the heel; (6) as few nails as possible should be used; (7) the nails should take a short, thick hold of the wall so that the old nail holes may be removed in the natural growth and paring of the horny substance. The foot is composed of a horny substance which becomes brittle and breaks away, especially as a result of extra strenuous work. In order to prevent this, the rim of iron is placed on the foot and can be renewed from time to time. The shoes and nails are now manufactured very economically by machinery. The advent of modern methods of locomotion and means of transport has greatly impeded the art of F. In the 18th and 19th cents. every vil. had its shoemaker, who, as mentioned above, combined his art with that of the blacksmith, thus causing evils which were only stamped out by modern systems of F. See J. Jeffray, *Address on the Present State of Farriery*, 1786; W. Douglas, *Horse-shoeing*, 1873; W. Hunting and A. Mattinson, *The Art of Horse-shoeing*, 1922; C. Holmes, *The Principle and Practice of Horse-shoeing*, 1928.

Fars, prov. of Persia (Iran), extending along the N. shore of the Persian Gulf, bounded by Isfahan and Yazd on the N., on the E. by Kerman, on the W. by Khuzistan, and on the S. by the Persian Gulf. The name is the same as the Gk 'Persis', which, originally the name of the prov., came to be the name by which the whole empire was called. The prov. is traversed by mt chains running parallel with the coast, intersected by fertile

valleys, rich in pasturage, vines, and fruits. The riva. are small and seldom flow into the sea. The climate varies greatly according to the altitude. The prin. products are dates, rice, olives, cereals, cotton, opium, tobacco, fruit, and vines. The cap. is Shiraz (pop. 169,100). The prin. occupations are agriculture and stock raising. The area of F. is about 53,000 sq. m. and the estimated pop. 1,500,000.

Farshut, or **Farshiout**, tn. of Upper Egypt, situated near the R. Nile, 20 m. S.E. of Girgeh, in a picturesque country of astonishing fertility.

Farsley, part of the bor. of Pudsey (q.v.), in the W. Riding of Yorks, England, $3\frac{1}{4}$ m. from Bradford. It has scribbling, spinning, and cloth manufacturing mills. Samuel Marsden, who first introduced Australian wool into England, and passed his life as a missionary in Australia and New Zealand, was b. here. Pop. 7000.

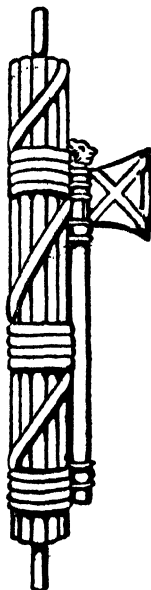
Farthing (A.-S. *feorþa*, a fourth, and *ing*, a diminutive) is the smallest Eng. bronze coin, and is equal in value to the 4th of a penny. It was instituted as a silver coin in the reign of Edward I, in which form it continued until the time of Mary. James I granted a patent to Lord Harrington of Exton in 1613 for the manuf. of brass F.s, but it was not until 1672 that copper F.s came into circulation in any number. In the reign of James II tin F.s were also in circulation for a short time. In 1860 copper F.s gave place to bronze, in which form they have continued. The experiment of issuing half-F.s was tried in 1842, but not proving successful, the coins were demonetised in 1869. In 1853, the last year in which they were minted, 913,920 half-F.s were coined. The present value of these coins is up to 1s. 6d. each according to date and condition. Half- and quarter-F.s were minted between 1839 and 1856 for use in Ceylon, and in 1844 one-third F.s were also struck for Malta. In 1897 the practice was adopted of darkening F.s before issue, that they might not be mistaken for half-sovereigns.

Farthingale (O.F. *verdugalle*, corruption of Sp. *verdugado*, from *verdugo*, a stick), case or hoop upon which were hung voluminous skirts. The material of the F. was originally wood and later whalebone. It first appeared in Spain at the end of the 15th cent., and reached its most exaggerated form in the 17th cent., when it consisted of a flat circular surface, projecting from the bodice. It was the forerunner of the crinoline (q.v.) of the 18th and 19th cents.

Farwell, Sir George (1845-1915), judge; 2nd son of Frederick Cooper F., of Tottenham, Staffordshire; graduated from Balliol College, Oxford, and called to the Bar in 1871. He decided the crucial point in the Taff Vale railway case, 1900, concerning the liability of trade union funds to attachment for damages. In 1906, after being for 7 years judge of the high court, he was made lord justice.

Fascés, bundles of rods bound with a red strap, carried on the left shoulder by

lictors (q.v.) in auct Rome before the chief magistrates of the rep. and later before the emperors, to symbolise their authority. The rods were generally made of birch or elm, and an axe protruded at a point above the centre. This axe, however, represented the power of life and death, and was therefore removed (except when borne before a dictator) within the city precincts, where an appeal lay to the sovereign people when a man's life was at stake. Twenty-four F. were carried for a



FASCES

dictator, 12 for a consul, and 6 for a praetor.

Fascia, or **Facia**, in architecture (i) the bands into which the architrave of the Ionic and Corinthian orders is subdivided (see ORDERS OF ARCHITECTURE); (ii) any long flat strip of wood, stone, or metal.

Fasciation, a phenomenon in plants arising when sev. lateral shoots fail to separate normally from the main axis in growth, but remain banded together, producing a broad flattened stem or stems. The precise cause is unknown, but is associated with over-nutrition and accumulation of plastic materials with the plant.

Fascinés are brush-wood faggots used for military purposes. They are generally about 18 ft in length, not quite a ft in thickness, and are bound tightly together

by means of wire or withes. They are used for roofing magazines, for bridge and road making, and also for revetting the steps and slopes of field-works. When cut up into one-third of the length they can be utilised in filling up a ditch, trench, etc., and are especially useful for supporting structures in marshy ground. During the Second World War F. laid by E.E. tanks facilitated the passage of wheeled and tracked vehicles over swamps and ditches.

Fasciola, parasite which causes liver rot in sheep, see LIVER-FLUKE and TREMATODES.

Fascism, name given to the political movement which arose in Italy soon after the First World War and which claimed that it would deliver the country from Bolshevism, restore its economic equilibrium, and raise it to its rightful place in the family of nations. The movement was led by Benito Mussolini (q.v.), and successfully dominated administration in Italy from 1922 until 1943. The symbol of F. (*Fascismo*) was the fasces (q.v.) and the *Fascista* salute was that of ancient Rome—by outstretched arm. The military organisation of the National Fascista party—as it was officially constituted, with its Great National Council—was on pseudo-Rom. lines, with Rom. names like 'legion,' 'consul,' 'centurion,' 'triarii,' 'senior,' and so forth. The coins bore on one side the Rom. fasces, and special gold coins were issued to celebrate the anniversary of the famous 'March on Rome' of Oct. 1922, which carried F. triumphantly into power. Discipline was rigorous; and the motto of F., 'No discussion, only obedience,' serves to explain the rapidity of the sudden mobilisations and demobilisations carried out by the organisation. F. also possessed a large and powerful Press and a publishing house in Milan. But the decisive factor in the victory of F. was over and above all the personality of its leader, the so-called *Duce*, Mussolini, the main-spring of the movement.

F. did not, however, present an absolutely new political phenomenon, but was really part of the general historical development of nations, and it reveals the theoretical influence of Machiavelli and Nietzsche (q.v.) and also of Sorel and Pareto. It has been compared to the 'krypteia' of Sparta, and the 'eterie' of Athens, and other similar expressions of self-defence of strong active groups or classes, uniting and forming centres of resistance. It came as a reaction to the complete apathy and disorder in parl. State functions in Italy and to the attraction (probably exaggerated) of the It. working classes to the gospel of Lenin following the First World War. It came at a time when economic chaos was rife; foreign exchanges were disorganised; the police impotent; the Carabineers insulted and even killed by the Communists. Resistance came from the patriots of the Trentino, the Carso, and other battlefields of the war, and the first encounter between them and the Communists was in 1921 at Bologna, which

date marks the wane of Bolshevism and the rise of F. Progress was at first slow; but masses of the working classes were soon enrolled among the Fascist syndicates scattered all over Italy, and these began activities by settling many important economic disputes and strikes. The army was secretly or openly in favour of F., and, contrary to the hopes of the Communists, would never have marched against the Fascisti. The very generals of the regular army wore the black shirts of the organisation, and themselves directed the March to Rome. In the closing months of 1922 the members of F. increased by leaps and reached even to the Alps and S. Sicily. Finally, in 1922, after a great meeting at Naples and after the March to Rome, Mussolini and his influential quadrumvirate, formed by de Bono, de Vecchio, Balbo, and Bianchi, the secretary-gen. of the party, were summoned by the king to form the first Fascist cabinet.

The Fascist Party (as in other European totalitarian states) was the only authorised political organisation in Italy during the period of the prevalence of F. The social system aimed at was the Corporative State (q.v.). F. claimed to be neither capitalistic nor socialistic. It maintained private property but subjected its use to State control. Trade unions and manufacturers' associations, both Fascist-controlled, were bound to co-operate in the Corporation. Spirit and organisation in the Party were militaristic. The statute of the Party described it as a civil militia at the orders of the *Duce* or leader and dedicated to the service of the State, with its chief aim the achievement of the greatness of the It. people. The Party was anti-liberal and anti-democratic, and stood for nationalism and imperialism. F. upheld violence, rejected civil liberties, and claimed the monopoly of education in its youth organisations. The party maintained its own army with a training and standing almost equal to those of the regular army.

F. served as a model to a number of similar political movements in other countries, notably, of course, to National Socialism (q.v.) in Germany and Falangism in Spain, and, indeed, in a broader sense the term 'Fascist' came to be used to describe almost any reactionary or authoritarian ruler, irrespective of profound diversities; as, e.g., Dollfuss (q.v.), Pétain (q.v.), whose policy as leader of the Vichy Gov. was increasing collaboration with Hitler; Salazar, the prime minister of Portugal, whose policy was formed on mildly Fascist lines; and Peron, the former dictator of the Argentine Rep. See further under ITALY, History; MUSSOLINI, BENITO.

See *Mussolini's Political Speeches*, trans. by Barone di San Severino, 1923; G. Gentile, *Origini e dottrina del fascismo*, 1930; G. Bourgin, *L'Etat Corporatif en Italie*, 1935; H. Finer, *Mussolini's Italy*, 1935; A. Rossi, *The Rise of Italian Fascism*, 1933; W. Ebenstein, *Fascist Italy*, 1939; P. Nathan, *Psychology of Fascism*, 1943.

Fashion (adapted from Fr. *façon*; Lat. *factio*, making, *facere*, to do, or make), used in the sense of the pattern or mode in which a thing is done, particularly employed in the sense of the customary or usual way in which a thing is done, and hence applied to the manner or custom prevalent at or characteristic of a particular period. All man-made works, except those of an exclusively utilitarian nature such as scythes or needles, are subject to changes of F., and to judgment from the point of view of prevailing F. And even aspects of nature—mts, the sea—have been esteemed differently at different times. Because clothes wear out quickly F.s in clothes change more frequently than F.s in, say, music or architecture, but slang phrases and popular songs, like dress, become quickly outworn and disappear from F. The commonest application of the word is to dress (q.v.), hence 'fashion-plate,' 'fashion magazine.'

Fashoda, post on the W. bank of the Upper Nile, Sudan, 459 m. S., by riv., of Khartoum. It is the cap. of the *mudiria* (prov.) of the Upper Nile. The climate is most unhealthy. F. is the residence of the 'Mek,' or king of the Shilluk tribe. An Egyptian military post was estab. at F. in 1865, which was also an important trading station. In 1883-4 the post fell into the hands of the Mahdists. In 1898 the Fr. commandant, Marchand, with a force from the Congo, hoisted the Fr. flag there. Sir Herbert Kitchener, having just captured Khartoum, re-hoisted the Brit. and Egyptian flags at F., and invited Marchand to withdraw. The latter refused, and the matter was referred to London and Paris. For a while the tension between the 2 countries was extreme, but in Dec. of the same year France, uncertain of the support of Russia, ordered the withdrawal of the Marchand expedition.

Fast and Loose, also called **Pricking at the Belt**, a cheating game much practised by sharpers at the fairs, especially by gypsies in the time of Shakespeare. A leathern strap is rolled or doubled up with a loop in the centre, and placed edgewise on the table. The sharper then seeks for someone to bet that he can catch the loop with a skewer, which looks easy: he then unrolls the belt in such a way that the catching of the loop is an impossibility. From this game comes the expression 'to play fast and loose'; the modern name of the game is 'Prick the Garter.'

Fasti (Lat. *fastus*, lawful), the days on which it was lawful to do business. In early Rom. times such days were declared by the priests, but were set up in the Forum on tables called F., which were practically the equivalent of calendars. They were of 2 kinds: the 'F. diurni,' strictly the calendars of the year, containing the list of lawful and unlawful days, the days for festivals and courts, etc.; and the 'F. annales,' or 'historici,' which contained the names of the consuls and other magistrates, and such historical events as were considered worthy of note.

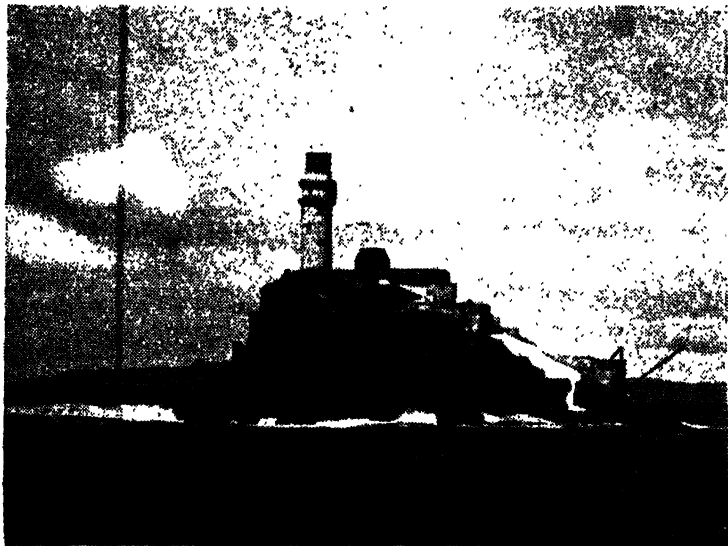
Fasting, strictly abstinence from all

food and drink for a given period, but much more commonly used for abstinence from certain kinds of food only.

1. **Religious**.—It is an accompanying feature of nearly every known form of religion; its motives and modes of practice varying, of course, according to race, climate, and civilisation. The origin of the practice is buried in obscurity; some authorities suggest that it arose from the custom of providing food for the dead, others that it was a preparation for the receiving of sacramental food, and others that it is the subjection of the lower nature in order to exalt the higher for the seeing of visions. Whatever the motive, partial or complete abstinence from food at stated periods was practised at a very early date by Parsees, Hindus, Egyptians, Assyrians, Greeks, and Romans. It was a prominent and inseparable feature of the Jewish ritual. The solemn national fast on the 10th day of every 7th month (the Day of Atonement), the penalty for the non-observance of which was death, was the only public fast ordained in the Books of Moses (Lev. xvi. 29-34; xxiii), but the practice of private and occasional public fasts, at periods of national calamity, is frequently recorded (Judges xx. 26; 1 Sam. vii. 6; 2 Sam. xii. 16). During the captivity the fasts of the 4th, 5th, 7th, and 10th months were instituted to commemorate certain incidents in the downfall of the nation. The number of special fasts mentioned in the N.T. and practised by the Pharisees and the disciples of St John the Baptist (Luke xviii. 12; Mark ii. 18), although insisted upon by the Pharisees, were really voluntary, and were probably never practised by the sect of the Sadducees and others. There is no reason to doubt that our Lord observed the one great national fast, but He neither upheld nor practised the fasts ordained by the Pharisees. The apostles and the fathers of the early Christian Church, however, influenced probably by such passages as Matt. ix. 15, not only practised F. themselves, but instituted it as an obligatory practice for all the members of the Church. In the Rom. Catholic Church there are the great 40 days' fast of Lent, the quatermonth fasts of 3 days in 1 week of each of the 4 seasons, while every Friday and on the eves of certain feasts there is abstinence from all flesh foods. The new legislation (1957) governing the eucharistic fast includes the following provisions: abstinence from solids and alcoholic liquids for 3 hrs before communion, from non-alcoholic beverages for 1 hr. Water may be taken at any time up to the moment of reception. In the Gk Church the practice is followed with much greater severity, and the fast days cover about three-quarters of the year. In the Anglican Church F. is regarded only as a useful exercise, praiseworthy, but never obligatory, and not in itself a means of grace; the Prayer Book, however, enumerates the 40 days of Lent, all the Fridays in the year with some exceptions, Ember days, Rogation days, and the eves or vigils of certain festivals.

In Scotland the sacramental fast days so long observed have almost entirely fallen into disuse. The Moslems, as an offshoot of the Jewish and Christian communities, adopted the practice of F. with many others; they regard it as an efficacious means of averting the wrath of Allah in national calamities, and of mitigating the penalties of sin. The month of Ramadan, in which Mohammed brought the Koran from Heaven, is strictly observed as a complete fast for all the faithful, eating, drinking, and smoking being forbidden from sunrise to sunset, and voluntary

surveillance made it impossible for her to have secret access to food and water; whereas in 1888 a Frenchman named Jacques, who partook freely of water during his fast, abstained from solid food for 30 days, and under similar conditions an Italian named Lucci in 1890 fasted successfully for 40 days. Emaciation and a lowering of body temp. are invariable accompaniments of starvation, the wasting occurring first in the fatty tissues and later in the muscles. The wasting process takes place less rapidly when the body is kept warm and exertion is limited



D. Rowlands

FASTNET ROCK AND LIGHTHOUSE

fasts are common. See R. Nelson, *Festivals and Fasts of the Church* (24th ed.), 1782; E. I. Lane, *Modern Egyptians*, 1836; Liesmayr, *Die Entwicklung der Christlichen Fastendisziplin*, 1877; E. Westermarck, *The Principles of Fasting*, 1907; R. Arbesmann, *Das Fasten bei den Griechen und Römern*, 1929. See also JEWS and MOHAMMEDANISM.

2. *Medical*.—By F. is usually meant the abstinence from solid food, the term total abstinence being used when water also is withheld. It has been proved by experiments that, whereas the human body cannot survive total abstinence for longer than 8 days, the free administration of water makes it possible to sustain life for 30 or 40 days or even longer. In 1859 a Welsh girl who pretended that she had lived for 2 years without food failed to survive for 8 days when strict medical

to a minimum. Apoplexy and intestinal ulceration frequently occur in the course of a prolonged fast. The insistent craving for food diminishes after the first few days and is succeeded by torpor.

3. *Political or Contumacious*.—F. has, in modern times, been frequently resorted to as a means of securing political ends. Thus, in the earlier days of the Feminist movement, 'suffragettes' fasted in the hope of furthering the attainment of their political goal. In the past hunger-strikes have frequently been undertaken by Irish patriots and Indian nationalists. Forcible feeding is generally attempted in these cases, but in others the attempt has been unsuccessful and the 'hunger strikers' have either yielded or died.

Fastnet Rock, in lat. 51° 23' N. and long. 9° 36' W., situated about 4 m. SW. of Cape Clear, off co. Cork, Ireland. A

lighthouse erected in 1854 stands on the R., and the light, which is revolving and 160 ft above high-water mark, is visible for 18 m.

Fat, in chem., mixture of glycerides. When the suet of beef or mutton is heated in a muslin bag in water, and kneaded so that the membranes of the F. globules are broken, the melted F. may be collected in the form of a liquid which rapidly cools to tallow. If this tallow be heated to about 200° C. under pressure, it decomposes into glycerol or glycerin, a sweet syrup used in toilet preparations, and certain acids known as fatty acids. All the F.s, butter, lard, bone-F., etc., and the liquids known as olive-oil, linseed-oil, palm-oil, etc., behave in this way. Glycerol is a trihydric alcohol, and, like the alcohols generally, reacts with acids to form ethereal salts, or esters. The esters of glycerol are termed glycerides, and are distinguished, according to the acids with which they are associated, as triacetin, tripalmitin, tristearin, triolein, etc. The chief glycerides present in F.s are the solids tripalmitin and tristearin, and the liquid triolein. The relative proportions of solid and liquid glycerides determine whether the substance is a F. or an oil at ordinary temps. Tallow, for instance, contains a preponderating proportion of tripalmitin and tristearin; lard, which is much softer, contains more triolein, while olive-oil contains a preponderance of triolein. At moderately high temps. the glycerides are decomposed by water into glycerol and their corresponding acid; thus, tristearin yields glycerol and stearic acid, triolein yields glycerol and oleic acid, and so on. The chief uses of F.s are in the manuf. of soaps, as ingredients in articles of food, as lubricants, and as media for colouring matter, etc. In the first 2 of these uses, solid fats are preferable to liquid ones and so natural F.s and oils are hardened by hydrogenation, usually using hydrogen and a nickel catalyst. Vegetable oils are often partially hardened to the consistency of lard. Long chain alcohols for the preparation of detergents are made by hydrogenating glycerides under pressure and temp. using copper chromite as a catalyst. F.s constitute an important item in an ordinary diet. They contain a relatively higher proportion of carbon than protein, which is the chief constituent of lean meat; and as carbon is discharged in large amounts from the body, it is desirable to replace it by a corresponding preponderance of F.s and carbohydrates in the diet. In Arctic regions, where the heat of the body has to be kept up by a plentiful supply of combustible material, human beings crave for F. to an extent incomprehensible to dwellers in temperate climates. See E. R. Bolton, *Oils, Fats, and Fatty Foods*, 1928; H. K. Dean, *The Utilization of Fats*, 1938; T. P. Hilditch, *The Chemical Constitution of Natural Fats*, 1940. For F. in the digestive process, see DIGESTION. See also ADIPOSE TISSUE.

Fata Morgana, It. name for a curious kind of mirage frequently observed in the

Straits of Messina, and so called because it is supposed to be caused by the fairy (*fata*) Morgana of the Arthurian legends. An observer on the shore frequently sees men, ships, or houses sometimes in the air, sometimes in the water, the same object frequently having 2 images, one inverted. The cause is the same as that of the desert mirage. See MIRAGE.

Fatalism, philosophic doctrine of the futility of human struggles against destiny. It is the basis of such different systems as those of Hegel and Herbert Spencer. The Stoics associated it with the idea of necessity, and contended that as such it was a power unalterable even by God. Theologically, it is the belief that life is governed by inevitable laws which depend on the arbitrary decrees of an Almighty, and also by the laws of nature; it is exemplified in Spinozism and in the later ideas of predestination. F. is essentially an Oriental conception, and is the predominating spirit of E. philosophy, literature, and religion, finding its strongest expression in the Mohammedan idea of Kismet.

Fatehpur Sikri, tn of Uttar Pradesh state, India, former cap. of the Mogul empire, 23 m. W. of Agra, founded in 1569 by Akbar as a thank-offering for the birth of his son, Selim. The magnificent architectural ruins, enclosed by a high wall 7 m. in circumference, include a splendid mosque and sev. palaces, including that of Akbar. It was deserted within 50 years of its foundation owing to lack of water, and is in a remarkable state of preservation as a whole.

Fates, The, see MOIRAE.

Father, see FAMILY; PARENT.

'Father Divine', Amer. negro, b. (according to the most reliable information) c. 1880 on a rice plantation on Hutchison Is. in the Savannah R. His original name was George Baker, and he became a devoted assistant to Samuel Morris in the Baptist Church Coloured, Baltimore, Maryland. Morris claimed to be indwelt by God, and conferred on Baker his 'Messenger' the title of 'God in the Sonship Degree' in 1907. In 1915 Baker arrived in New York and eventually proclaimed that he alone was God, F. D. He demanded renunciation of all family attachments and of all sexual relationships, though himself twice married (in what is claimed to be a purely spiritual union). His followers are called 'angels,' and he maintains 'heavens' for them in various places. His main centres are in New York, Philadelphia, and Newark. His worshippers are chiefly negroes, but include some whites, and their numbers are considerable; they provide substantial revenues. See Sara Harris, *The Incredible Father Divine*, 1954.

Father of the Chapel, name bestowed on a person in any printers' trade society who is held responsible for seeing to the faithful performance of the duties and regulations by the members of that society in any printing office. A C. exists for each section of the trade, i.e. composing-room, stereotyping, etc., within

each printing-house. When Equity was formed the organisation was based on the practice in the printing industry. Therefore to-day every theatre has its own C., complete with F. and clerk.

Fathers of the Church. The patriarchs are described in the O.T. as the 'Fathers of Israel,' and the early Christians, as spiritual Israelites, still so regarded them; but for long they would not give the name 'father' to their own spiritual heads, remembering our Lord's warning, 'Call no man your father upon the earth' (Matt. xxiii. 8). Yet the mob of Jews and pagans at the martyrdom of Polycarp cried out, 'This is the Christians' father.' In the 4th cent. Athanasius defends the term *homousios* as earlier used by certain 'fathers,' and after this the word frequently occurs in councils, such as those of Constantinople and Chalcedon. Strictly speaking, the F. of the C. are those writers of the early centuries who were remarkable for their perfect orthodoxy, and great sanctity, and whose writings have ever been regarded as, after the Bible, the most valuable portions of Christian literature. The term is, however, also used to include Tertullian and Origen, and other writers who were slightly or entirely heterodox. In the great *Patrologia* of the Abbé Migne, writers such as Theodore of Mopsuestia and Pelagius are included, but these come under the last head of the sub-title, *Scriptorum ecclesiasticorum*. Thus the study of patristics or patrology is not restricted to orthodox writers. Rom. Catholic theology regards the unanimous consent of the F. as infallible. The Anglican Church also appeals to them as depositaries of the true primitive tradition. Almost invariably the F. of the 1st cent. are considered apart from the rest under the title 'Apostolic Fathers' (q.v.), as being the immediate friends and disciples of the Apostles, while the *patristic* period proper may be said to start with the 2nd cent., no definite date marking its termination. Migne, in his *cursum completus*, carries his patrology down to about 1200 for the Latins and to the Fall of Constantinople for the Greeks, but for ordinary purposes this range is too extensive. A more usual limit is the time of Gregory the Great (d. 604) in the W. and that of John of Damascus (756) in the E. After this the freshness and spontaneity of thought which mark the early writers almost entirely disappears. Two groups of the F. stand out above the rest, and receive the title 'Doctors of the Church.' The W. or Lat. Doctors are Ambrose, Augustine, Jerome, and Gregory the Great; the E. or Gk. Doctors are Athanasius, Basil the Great, Gregory of Nazianzus, and John Chrysostom. The chief div. after the Apostolic F. and in the Patristic age comes with the Council of Nicaea and the Conversion of the Empire. Chief among the ante-Nicene F. are: Justin Martyr, Clement of Alexandria, Origen, Dionysius, Gregory Thaumaturgus, Methodius, Tertullian, and Cyprian. Chief among the post-Nicene F. are

Eusebius of Caesarea, Athanasius, Cyril of Jerusalem, Basil, Gregory of Nazianzus, Gregory of Nyssa, John Chrysostom, Theodoret, Cyril of Alexandria, Photius, Hilary of Poitiers, Ambrose, Augustine, Jerome, Rufinus, Leo the Great, John Cassian, Hilary of Arles, Vincentius, and the English Bede. See J. G. Dowling, *Notitia Scriptorum ss. Patrum*, 1839; F. J. Hort, *Six Lectures on the Ante-Nicene Fathers*, 1895; H. G. Krüger, *History of Early Christian Literature in the First Three Centuries*, trans. 1897; H. B. Swete, *Patristic Study*, 1902; K. Leighton-Bennett, *Handbook of the Early Christian Fathers*, 1920; L. Prestige, *Fathers and Heretics*, 1940; S.C.M., *Library of Christian Classics*, vols. 1-8, 1956 f.

Fathom, see METROLOGY.

Fathometer, instrument for measuring the depth of the ocean, by measuring the interval of time that elapses between the production of a sound at the surface of the sea and the arrival of the echo from the bottom. Great strides have been made in recent years in the development of these instruments, first suggested in 1912 after the disaster to the *Titanic*. To-day every important ship is equipped with a F. See A. Wood, *Sound Waves and their Uses*, 1930, for an excellent account of the various types now used.

Fatigue: 1. In physiology, 'muscular F.' is the diminishing of the contractions brought about by stimuli. The muscle is a machine for utilising the energy contained in its own chemical compounds; if the excitations of the muscles are continued beyond a certain point the muscle cells are poisoned by the accumulation of the waste chemical products of their own activity. The muscle recovers if allowed to rest unstimulated for a time, or more quickly if washed with an innocuous but unnutritious solution such as 6 per cent NaCl in water. The same waste-products of the muscles produce 'F.' in the unsheathed ends of the nerve-plates, and the central sensor and motor nerve cells exhibit the same phenomena and a general irresponsiveness to ordinary stimuli.

2. In materials, F. is the term used to denote the weakening of a metal bar by a repeated succession of the strain of loads considerably less than the breaking weight of the bar, as when a car-axle breaks from the continual strains and blows which it experiences, or a member of machinery, such as a piston-rod, which is constantly in alternate tension or compression. F. of metals is due to a molecular change in the metal due to vibration or the constant application of a varying strain.

Fatigue-duty is that part of a soldier's work which is distinct from the use of arms and military drill, such as loading stores. 'Fatigue call' is the bugle note which calls to such duty, and 'fatigue dress' the uniform worn while engaged in it.

Fatima, daughter of Mohammad and Khadija. She married her cousin Ali (q.v.) and so is the link through whom sayyids and sherifs claim descent from Mohammad. For Muslims she is one of

the 4 perfect women, and for the Shi'a (q.v.) especially 'the incarnation of everything divine in the nature of woman, the most noble ideal attainable by man.' The date of her birth is not known and she d. a few months after her father.

Fatima, vil. of Portugal, in Santarém dist., 22 m. N. of Santarém (q.v.). It is a place of pilgrimage, on account of the believed appearance of the Blessed Virgin here to 3 children in 1917. Many thousands from all over the world now visit F. each year. See C. C. Martindale, *The Message of Fatima*, 1954; E. L. Klimeck, *A Modern Crusader*, 1956; R. F. Hume, *Our Lady Came to Fatima*, 1957.

Fatimids, or **Fatimites**, name given to a dynasty of Arabia which reigned for nearly 2 centuries over Egypt. Its founder, Obaidallah, claimed to be descended from Fatima, daughter to the prophet Mohammad, and Ismael, great-grandson of Ali. But later it was suggested that the founder of the dynasty had no right to the sovereignty, and that he was in reality descended from a family of heretics known as the Karmathian sect. The F. were an extremely militant sect; under Al Mo'izz (973-5) their rule extended to the shores of the Atlantic. In 969 they finally conquered Egypt and founded Cairo. Al Hakim, 6th caliph, founded the Druse sect, and the 'Assassins' came into being owing to a split over the succession in 1094.

Fattening Foods, **Fodder**, and **Forage Crops**, terms used to denote those foods used for feeding animals for meat or milk production. Compared with other types of foods, the 'concentrates' contain a high proportion of certain nutrients. They include food of both animal and vegetable origin and can be subdivided into carbohydrate and protein-rich foods. Carbohydrate concentrates are usually of fairly low protein content but high carbohydrate content, and include the cereal grains. The protein concentrates consist of some foods of animal origin such as whey, dried blood, meat meal, etc., and some of vegetable origin such as brewery and distillery products, peas, beans, and cakes and meals from the oil-milling industry.

The bulky fodder crops are characterised by a high fibre and low protein content and include hay, straw, and chaff. Hay (q.v.) is the most valuable of these, but oat-straw cut before it is quite ripe is also quite a valuable bulky food. In contrast to these rather coarse fodders there are also bulky foods of a very succulent nature. They contain 75-90 per cent of water and include forage crops (lucerne, clovers, grasses, kale, and rape) and other crops such as mangolds, swedes, and potatoes. The comparative richness in protein of the green fodders makes them the natural supplements to carbohydrate-rich foods.

In feeding animals a consideration of the animal's maintenance and production requirements must be made. The maintenance requirement includes energy and

protein used for the vital processes of life. Productive food is supplied in addition to the maintenance ration and is utilised for work, growth, or the production of milk, eggs, fat, or young. But the food must also satisfy the animal's appetite and the 'bulk' of the ration must be considered. If the bulk is too little then the animal will feel hungry, and if it is too much the animal's appetite will be satisfied before it has ingested sufficient energy and protein for production purposes. Generally speaking the ration should include both concentrated and bulky foods in suitable proportions just to satisfy appetite and production needs. If the diet is compounded in this way shortages of essential vitamins or minerals are unlikely. It can be seen that there is a variety of foods of each type and by using these in various mixtures some welcome variety will be introduced into the ration.

A proportion of the food which is voided in the faeces and urine contains a certain amount of fertiliser in the form of unretained nitrogen, phosphate, potash, and lime. The concentrated foods rich in protein give a dung rich in nitrogen, but the actual amount depends so much on the type of stock that it is impossible to predict exactly what proportion of the nitrogen, say, will appear in the dung. Using quite arbitrary figures it is possible to work out the residual manurial values of different foods fed to particular classes of stock. On the whole these calculations are unreliable but they are used when valuing farms before sale.

See B. H. Schneider, *Feeds of the World*, 1947; Commonwealth Agricultural Bureaux, *Five Hundred Varieties of Herbage and Fodder Plants*, 1948; H.M.S.O., *Rations for Livestock*, 1952; E. J. Sheehy, *Animal Nutrition*, 1955; F. B. Morrison, *Feeds and Feeding*, 22nd ed. 1956.

Fatty Acids, an important group of related organic acids which occur in nature, the higher members being combined with glycerol (q.v.) in the form of esters known as triglycerides, various mixtures of which constitute the natural fats and oils. They are compounds of carbon, oxygen, and hydrogen, characterised by the acidic or carboxyl group ($-\text{COOH}$) attached to a hydrocarbon chain. In the latter, the carbon atoms are linked together with single or double bonds while their remaining valencies are satisfied with hydrogen atoms. F. A. in which the carbon atoms are joined by single bonds are designated as 'saturated' and are stable and relatively unreactive; in nature they all contain an even number of carbon atoms and have the general formula $\text{C}_n\text{H}_{2n+1}\text{COOH}$. Those with double bonds or 'ethylenic' linkages are referred to as 'unsaturated' acids, and are subdivided into mono-, di-, tri-unsaturated acids, etc., according to the number of double bonds present in the hydrocarbon chain. Prin. F. A. are saturated: acetic, butyric, caproic, caprylic, capric, lauric, myristic, palmitic, stearic, arachidic, behenic, and lignoceric; unsaturated: oleic (1 d-bond), linoleic (2 d-bonds), and

linolenic (3 d-bonds). The higher members (containing more than 10 carbon atoms—lauric, myristic, palmitic, stearic, oleic, linoleic, etc.) in chemical combination with glycerol form the main constituents of animal and vegetable fats and oils, while the lower members (caproic, caprylic, and capric) form a minor constituent in only a few natural fats and oils. Lower acids up to and including caprylic and the unsaturated acids oleic, linoleic, and linolenic are liquids, whereas capric and higher saturated acids are solids; also the lower acids are water-soluble while the higher acids are relatively insoluble in water but soluble in ether, alcohol, and other organic solvents. F. A. required for industrial applications are obtained chiefly from natural fats and oils by hydrolysis, producing F. A. and glycerol; others, not found in nature, and including those with an odd number of carbon atoms in the chain, may be prepared by organic synthesis or by chemical or physical treatment of natural fats and oils or their F. A. F. A. are used extensively in most branches of industry; in the reconstruction of glycerides with special properties; in the production of compounds by neutralisation, esterification, modification or complete replacement of the carboxyl group while maintaining the long hydrocarbon chain, and in the formation of products by chemical combination of the unsaturated acid or its ester with other molecules through the reactivity of the double bonds. Poly-unsaturated F. A. are capable of linking together either by oxidation or polymerisation, and where 2 or more are present in a tri-glyceride, combination of the molecules to form a complicated lattice structure becomes possible. Oils of this type are called 'drying oils' and form the basis of the paint, printing ink, linoleum, and other industries. The addition of hydrogen to the double bonds of unsaturated glycerides by catalytic hydrogenation raises their melting points and makes them suitable for use in margarine, cooking fats, etc. The many hundreds of derivatives produced include soaps or salts, halides, esters, anhydrides, ketones, aldehydes, alcohols, amides, nitriles, amines, etc., which are used particularly in the production of household and industrial cleaners, cosmetics, lubricants, protective coatings, leather dressings, synthetic fibres, edible products, printing inks, plastics, synthetic resins, polishes, etc. See also OLEIC ACID; PALMITIC ACID; STEARIC ACID.

Fatty Compounds, see ALIPHATIC.

Fatty Degeneration, a derangement of metabolism by which the protein matter of the tissues is replaced by fat. Under normal conditions, globules of fat pass from the digestive tract into the tissues, where they are either oxidised to keep up the heat of the body, or are stored in the cells of adipose tissue. Under certain morbid conditions, however, the oxidising capability of the cells seems to be interfered with. The cytoplasm is invaded by granules of fat which can be recognised

by the usual fat-staining reagents. The manner in which the change is brought about is somewhat obscure, but it is always associated with some toxic agent. All dead and decaying matter in the body undergoes F. D.

Faucher, Léon Joseph (1803-54), Fr. statesman and economist, b. Limoges. He edited and contributed to various journals on economic and political problems. In 1842 he visited England in order to study industrial conditions there, and afterwards compiled his *Études sur l'Angleterre*, 1845. After the Revolution of 1848 he was appointed minister of public works and, later, minister of the interior. He served under Louis Napoleon, but resigned his office when the emperor advocated universal manhood suffrage (1851). He was a firm upholder of free trade.

Faucht, Helena Saville (1817-98), actress, daughter of John Saville F. She took the Shakespearian parts of Juliet, Imogen, and Hermione, and made such an impression on Macready that he engaged her to take the leading characters in Lytton's *Duchesse de la Vallière* and *Lady of Lyons*, and in Browning's *Straford*. She married Theodore Martin (q.v.) in 1851; he was knighted in 1880.

Faulkner, or Falkner, William Harrison (1897-), Amer. novelist, b. New Albany. He was educ. at the univ. of Mississippi, of which his father was treasurer. In the First World War he joined the Canadian Air Force and was wounded in France. Afterwards in New Orleans he formed a friendship with Sherwood Anderson (q.v.) and wrote *Soldier's Pay*, 1926, and *Mosquitoes*, 1927. In 1929 he pub. *The Sound and the Fury*, in which his novels to employ the 'stream of consciousness' technique, which describes thoughts and reactions instead of actual happenings; it and *As I Lay Dying*, 1930, made his reputation, though *Sanctuary*, 1931, a horror story, was the first of his books to be really popular. *Sartoris*, 1929, was the first of a series of novels dealing with a single family who form the centre-piece of a saga of S. decadence. In 1939 F. won first prize in the O. Henry Memorial Award, and in 1950 he was awarded the Nobel Prize for Literature. Among his later novels are *Light in August*, 1932, *Absalom, Absalom!* 1936, *The Wild Palms*, 1939, *The Hamlet*, 1940, *Intruder in the Dust*, 1948, and *Requiem for a Nun*, 1952. *Idyll in the Desert*, 1931, *Dr Martino*, 1934, and *Go Down, Moses*, 1942, are vols. of short stories, while books of his verse include *The Marble Faun*, 1924, *Salmagundi*, 1932, and *The Green Bough*, 1933. Grotesque and often obscure, F.'s work has been described as in the tradition of Poe.

Faults: 1. In electric networks, accidental alterations in the state of the network or of any machines, switch-gear, or other apparatus connected thereto. Reduction of the insulation resistance, i.e. flashover, spark, or arc between a conductor and earth or between 2 conductors, deterioration of insulating material or of

insulating properties of insulators or bushings, may be caused by thunderstorms, strong wind causing swinging of overhead lines, snow, or hoar-frost, fog, salt, or dust deposits on insulators, or by internal conditions: overload with excessive temp. rise, or switching operations (see TRANSIENTS). Alterations (not intended) in switching-positions, leading to isolation of sections of the network or of machines, or to connections causing overloading, may result from the above-named phenomena or from interference from other networks. F. may be intermittent, as in the case of re-closing circuit-breakers, or cause lasting disturbance, interruption of supply, or damage to lines or machines which must be repaired before supply can be restored.

Detailed records of F., with data on location, network characteristics, load conditions, analysis of cause and effects, are kept in most countries. In W. Germany the records are now standardised.

2. In geology, fractures of the earth's crust along which rock masses have been

Tear-F., also products of compression, are steep fractures along which lateral movements took place. Faulting produces lines of weakness in the crust which are often excavated by erosion; the Great Glen of Scotland, in which lies Loch Ness and the Caledonian Canal, follows the line of a large fault. The San Andreas Fault, the site of the San Francisco earthquake of 1906, defines part of the coast of the Gulf of California.

Faun, Faunus, Rom. god and protector of shepherds. Later identified with the Gk Pan. F. was supposed to have been the 3rd sovereign of the Laurentines; his predecessors were Picus, god of storm and lightning, and Saturnus, god of seedtime and harvest.

Fauna, term used by naturalists in reference to the collective animal life of any dist. or of any period in hist. Thus we have the F. of the Brit. Isles, or the F. of the Antediluvian age. F. is derived from Faun (q.v.), protector of shepherds and therefore of wild animals.

Faure, Edgar (1908-), Fr. politician, became a lawyer, and was an assistant delegate at the Nuremberg Trials, 1945. In 1946 he was elected Radical Socialist deputy for the Jura. He held office in sev. govts. from 1949, was premier for a short time in 1952, and again premier Mar.-Dec. 1955, succeeding Mendès-France (q.v.) and becoming leader of the faction of his party which had dissociated itself from Mendès-France's policies.

Faure, François Félix (1841-99), Fr. politician, b. Paris, son of a furniture maker. He became a successful merchant at Havre. Elected to the National Assembly in 1881, his knowledge of economics and of commercial affairs soon made him a prominent figure. He held various ministerial posts from 1883 and became president of the rep. in 1895 upon the resignation of Casimir-Périer. The Franco-Russian alliance was one of the chief events of his presidency, which also saw the beginnings of the Dreyfus affair.

Fauré, Gabriel (1845-1924), Fr. musical composer, b. at Pamiers. He studied at the School of Sacred Music, directed by Niedermeyer, under Dietsch and Saint-Saëns. After minor organist's posts at Rennes (1866-70) and in Paris, he became choirmaster at the church of the Madeleine in 1877, and organist in 1896; and director of the Conservatoire, 1905-20. His music includes the operas *Prométhée* and *Pénélope*; incidental and church music; pieces for solo instrument and orchestra; 6 chamber works; 2 violin and 2 cello sonatas. His numerous piano pieces (impromptus, barcarolles, nocturnes, etc.) are among the most subtle works for the instrument, and his 97 songs rank with those of the greatest masters. See C. Koehlin, *Fauré*, 1927 (Eng. trans. 1946); P. Fauré-Fremiet, *Gabriel Fauré*, 1929; V. Jankélévitch, *Gabriel Fauré et ses mélodies*, 1938; N. Suckling, *Fauré* (Master Musicians), 1946.

Fauriel, Claude Charles (1772-1844), Fr. historian and philologist, b. St Etienne.

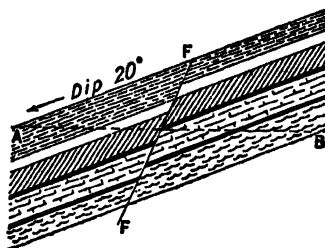


DIAGRAM OF FAULT (FF)

The angle made by the slope of the strata with the horizontal line AB is the angle of dip of the strata.

displaced. Movement along F. is the cause of earthquakes. The displacement produced at any one time is generally small, but repeated movements along the same lines may ultimately produce displacements of many m. Faulting breaks the continuity of sedimentary strata, of igneous intrusions, and of ore bodies, and its effects are therefore of considerable importance in mining operations—for example, a coal seam that is crossed by a fault may be shifted upwards, downwards, or sideways, and a study of the whole geological structure may be needed to locate its new position. 'Normal' F. are steep fractures along which subsidence took place on the side towards which the fault dips; they are formed largely by movements under the influence of gravity. 'Reversed' F. show an upward movement on the side towards which the fault plane dips. They are commonly the result of compression and pass into gently-dipping thrust-F. along which one rock mass overrides another.

He was a student of Sanskrit and Arabic, as well as of Lat. and Greek, and was appointed a prof. in the Paris Faculté des Lettres. His most outstanding work is *Histoire de la Gaule Méridionale sous la Domination des Conquistadors Germains*, 1836.

Fausset, Hugh l'Anson (1895-), critic, b. Killington, Westmorland, son of a clergyman. Educ. at Sedburgh and Cambridge, he worked as a critic and reviewer, and pub. penetrating studies of Keats, 1922, Tennyson, 1923, Donne, 1924, Coleridge, 1926, Tolstoy, 1928, Wordsworth, 1933, and Whitman, 1942. He also wrote some vols. of poetry and ed. *Minor Poets of the Eighteenth Century*, 1930. *Between the Tides*, 1943, and *The Last Days*, 1946, are novels, while *A Modern Prelude*, 1933, and *Towaris Fidelity*, 1932, are autobiographical.

Faust. The legend of F. is held by many historians to be of E. origin, but its European interest derives from a 16th-cent. magician, F., or Faustus, of Suabia, reputed to have studied necromancy in Krakow and to have exploited Germany in the rôles of astrologer, diviner, medium, alchemist, and swindler, a veritable ally of Mephistopheles. The earliest hist. of F. appeared at Frankfurt in 1587, and was speedily followed by numerous and varied versions, each more embellished than the previous one, the chief of these being G. R. Widmann's, 1599. From this J. N. Pfitzer compiled an encyclopaedic version of which 6 eds. appeared between 1874 and 1926. The chief Ger. ed. of the period was pub. in 1712, under the authorship of 'Christlich Meynenden' (A Christian Believer). Meanwhile the story had appeared very rapidly in foreign trans., Dan. being the first, 1588, Eng., Fr., Dutch, and Flem. following during the next 6 years, and Czech in 1612. The Eng. trans. was the basis of Marlowe's *Tragical History of Doctor Faustus* (performed in 1594, pub. 1604), the finest of the early F. dramas. In Germany every little puppet-show had its own version of the legend, right up to the middle of the 18th cent. In 1759 Lessing's dramatised version was written, but has since been destroyed save for a few sheets of MS.; it was in his hands that the legend first assumed the shape which has become accepted, a more modern and tolerant spirit superseding the stern uncompromising attitude of the earlier eds.

Goethe was the first to introduce the Gretchen incident in his magnificent work (1798). This violation of the legend had no apparent reason, beyond broadening the secular dramatic interest to meet modern demands; and the innovation was condemned by purists as unjustifiable. However, it is Goethe's version—well called the 'divine comedy' of 18th-cent. humanism—that has become recognised as the greatest literary achievement of the vast number that have been attempted on the same subject, and round it has arisen an important and extensive musical literature. Music was written for a production at Stuttgart, 1832, by Lind-

painter, and a score by Prince Radziwill was pub. in 1846. A choral dramatic legend by Berlioz, *La Damnation de Faust*, was performed at Paris in 1846, the text being derived by the composer and Gaudonnières from De Nerval's adaptation. The most famous setting is Gounod's *Faust*, performed at Paris in 1859—a very beautiful 5-act opera to a libretto by Barbier and Carré. Boito's *Mefistofele* (Milan, 1868) is also from the same source as those of Gounod and Berlioz. On a lower plane altogether, and quite estranged from Goethe's masterpiece, is the *Faust* of Spohr, a romantic 2-act opera to a wretched and vulgar text by Bernhard, produced at Frankfurt in 1818. Goethe's work has also inspired some 'absolute' music, notably the *Faust Symphony* of Liszt, and Wagner's *Faust Overture*. See H. G. Meek, *Faust, Man and Myth*, 1930; G. Bianquis, *Faust, à travers quatre siècles*, 1934; P. Palmer and R. Moore, *The Sources of the Faust Tradition*, 1936; E. M. Butler, *Fortune of Faust*, 1952.

Faust, Johann (a printer), see FUST.

Faustina, Anna Galeria: 1. The Elder, wife of Antoninus Pius (q.v.).

2. The Younger, daughter of Antoninus Pius by the above, and wife of Marcus Aurelius (q.v.). She is alleged to have been profligate and even guilty of high treason; but both charges rest upon slender evidence, for she founded institutions for the relief of poor girls, and retained the emperor's devotion until her death (AD 176).

Fauvism, movement in art which originated in Paris in 1903 as a revolt against Impressionism. It became the name of a group of artists among whom were Matisse, Dufy, Derain, Lhote, Vlaminck, Marquet, and Friesz. These sought to invest colour with an emotional value of its own apart from being descriptive of colour in nature. The name F. is derived from a slighting reference by the Parisian art critic, Louis Vauxcelles, to the gallery of works of the artists of the group. He called it a 'cage aux fauves,' or cage of wild-beasts.

Favara, tn in Sicily (q.v.), 4 m. E. of Agrigento (q.v.). There are sulphur mines and marble quarries in the dist. Pop. 25,200.

Favart, Charles Simon (1710-92), Fr. dramatist, b. Paris. He was educ. at the college of Louis-le-Grand, and his poem, *La France Délivrée par la Puellle d'Orléans*, obtained a prize at the Académie des Jeux Floraux. He became director of the Opéra Comique, which, under him, became very successful. In 1746 he went with Maurice de Saxe to Flanders with a troupe of comedians, where he became very popular. In 1750 he returned to Paris and resumed his writing. Some of his works (all written 1754-63) are: *L'Anglais à Bordeaux*, *Les Trois Sultanes*, *Ninette à la Cour*, and *Mémoires et Correspondance Littéraire*, which gives valuable information on the literary and theatrical world of the 18th cent.

Faventia, see FAENZA.

Faversham, municipal bor. and riv.-port of Kent, about 10 m. from Canterbury. It dates back to about 811, and was a seat of the Saxon kings. It contains the remains of a Cluniac abbey, founded by King Stephen, in which he is buried, and has a grammar school which was started in 1527. It is important for its oyster fisheries, which were formerly under the direction of an ancient guild and now of a statutory company, as well as for its shipping trade in coal, timber, and agric. produce, including especially hops and cherries. There are large fruit canning, grading, and packing stations; brewing and brick-making are carried on. Pop. 12,294 (1954).

Favighana *see* AEGADIAN ISLANDS; AETHUSA.

Favonius, Lat. name of the W. or SW. wind which prevailed in spring. Gk *zephyrus*.

Favre, Jules Claude Gabriel (1809-80), Fr. statesman, b. Lyons, and studied for the Bar at Paris. He took part in the Revolution of 1830, openly declaring himself a republican. He became an implacable opponent of Louis Napoléon, and in 1851 tried to organise armed resistance to him in the streets of Paris. He estab. his reputation by his defence of Orsini, 1858, and in 1870, after the defeat at Sedan, proposed the deposition of the emperor. F. was minister of foreign affairs under the Rep., and told Bismarck (1870) that he would not 'yield to Germany an inch of territory nor a single stone of fortresses.' But he proved no match for Bismarck's diplomacy, and resigned after the treaty of Frankfurt, 1871.

Favus, contagious skin disease, caused by a fungus parasite. It usually affects the scalp in man, but is occasionally found on other parts of the body. It also affects cats, dogs, cattle, mice, rabbits, and other animals. The growth consists of a number of yellow, circular saucer-shaped scabs, each surrounding a single hair. The scabs grow and become encrusted; ultimately they break off, leaving a bare patch without a trace of hair. The characteristic scab may then develop again, as it is extremely difficult to get rid of all traces of the parasite. The fungus was first described by J. L. Schönlein in 1839, and from the name of its discoverer is called *Acherion Schönleini*. It is more common in the E. parts of Europe than the W., and is often associated with uncleanly habits. Contagion may take place from animal to man. The treatment involves removing the crusts with every consideration for cleanliness. The parts should then be dressed with an efficient parasiticide.

Fawcett, Edward Douglas (1866-), philosopher, b. Hove and educ. at Newton College, Devon, and Westminster School. In philosophy he is an idealist whose distinctive mark is the discussion of imagination as the fundamental reality of the universe (*see Contemporary British Philosophy*, vol. ii, 1925). Pubs.: *Divine Imagining*, 1921, *The Zermatt Dialogues*,

1931, *From Heston to the High Alps*, 1936, *The Oberland Dialogues* (on the soul), 1939.

Fawcett, Henry (1833-84), economist and politician, b. Salisbury. He was educ. at King's College, London, Peterhouse, Cambridge, and Trinity Hall, where he became 7th wrangler in 1856, and was elected to a Fellowship. He entered at Lincoln's Inn with the intention of becoming a member of parliament through a career at the Bar, but was unfortunate to lose his eyesight in 1858. However, he kept up all his recreations, fishing, rowing, skating, as well as his studies. He was a disciple of Mill, and pub. in 1865 a *Manual of Political Economy*, the result of which was the election of F. to the chair of political economy at Cambridge. In 1865 he was elected member for Brighton, and re-elected in 1868-74, and is spoken of as being a thorough Radical. In 1873 he took a prominent part in opposing Gladstone's scheme for univ. education in Ireland. He was a great advocate of the preservation of commons, especially those near large towns, and showed a marked interest in Indian affairs. In 1880 he was offered the place of postmaster-general by Mr Gladstone, and estab. in 1882 the parcels post. He is also responsible for the introduction of postal orders, 6d. telegrams, stamp slip deposits, and the increased facilities for life insurance and annuities. His pubs. include *The Economic Position*, 1865, *Pauperism*, 1871, *Free Trade and Protection*, 1878, *Indian Finance*, 1880.

Fawcett, Millicent Garrett, Dame (1847-1930), b. Aldeburgh, Suffolk, famous for her social and literary work, especially as an advocate of women's suffrage and the higher education and employment of women. In 1867 she married Henry F., the politician. She held the degree of LL.D. (Hon.), St Andrews, and was president of the National Union of Women's Suffrage Societies. Pubs.: *Political Economy for Beginners*, 1870, *Tales in Political Economy*, 1875, *Some Eminent Women of our Time*, 1889, *Women's Suffrage*, 1912.

Fawkes, Guy (1570-1606), conspirator, b. York of Protestant parents. He became a zealous Rom. Catholic, and served in the Sp. Army in the Netherlands from 1593 to 1604. He gained a reputation for courage and coolness, and Catesby (q.v.) invited him to England to play the leading part in his Gunpowder Plot. F. himself apparently took no part in working out the scheme; but he was captured in the vault under the House of Lords, the plot having been betrayed to the gov. He was terribly tortured, and eventually disclosed the names of his fellow-conspirators, protesting to the end that no priests were involved in the plot. He was subsequently executed.

Fawn, *see* DEER.

Fay, Morgue de, *see* MORGAIN LE FAY. **Fay**, William George (1872-1947), Irish actor and theatrical producer, one of the founders of the modern Irish dramatic movement which grew into the Abbey

Theatre, and one of the creators of the style of quiet acting which made that theatre famous. After acting with a travelling circus company in Ireland and England, he took leading parts in Abbey plays until 1908, when he left, with his brother Frank, after a disagreement with the directors on the policy. The F.s took a company to the U.S.A. but it had indifferent success. F. from 1910 acted in various London theatres and in repertory in the provs.: in Glasgow he was in charge of the Scottish National Players. In his late years he deserted the stage and took only occasional parts in films; his most successful part was that of Father Tom in the film *Odd Man Out*, 1947.

Fayal, see AZORES.

Fayette, Comtesse de la, see LA FAYETTE, MARIE MADELEINE, COMTESSE DE.

Fayette, Gilbert M. de la, see LA FAYETTE.

Fayetteville: 1. City in Arkansas, U.S.A., cap. of Washington co. It is the seat of the univ. of Arkansas, and a trade and distribution centre for a fruit-growing, stock- and poultry-raising area. It manufs. clothing and wood products, and there are also dairies, canneries, and poultry-packing plants. Pop. 17,070.

2. City in N. Carolina, U.S.A., cap. of Cumberland co., situated on Cape Fear R., which has been rendered navigable as far as the coal mines of Chatham co. The former name of F. was Campbelltown, the change being made in memory of Lafayette. It is a trade centre with textile and lumber mills. Fort Bragg and Pope Air Force Base are NE. It was the scene of a terrible flood in 1908. Pop. 17,248.

Fayolle, Marie Émile (1852-1928), marshal of France, b. Le Puy. Entered the École Polytechnique in 1873, and afterwards joined the artillery. Instructor at École de Guerre, 1897. Brigadier-gen. on retired list when the First World War broke out. On mobilisation, was given command of 70th Reserve div. Succeeded Pétain in command of Sixth Army, Feb. 1918. Transferred to First Army in Dec. In May 1917 was in command of group of armies in centre, and in autumn was in Italy to assist after Caporetto. Soon recalled, did excellent work until armistice; was retained as gen. of div. on Gen. Staff, and made marshal 21 Feb. 1921.

Fayrer, Sir Joseph (1824-1907), surgeon-general and author. In 1850 he became assistant-surgeon in Bengal, and his connection with the Indian medical service lasted for 45 years. He was a prolific writer on subjects connected with the practice of medicine in India, and above all on the venomous snakes of that country. His great work on *The Thanatophidia of India*, 1872, is the best book on the subject.

Fayrfax, Robert (1464-1521), composer, b. Lincs, became a Gentleman of the Chapel Royal about 1496 and organist of St Albans Cathedral at the turn of the century. He took the Mus.B. (1501) and Mus.D. (1504) at Cambridge, and the D.Mus. at Oxford (1511), as one of the

earliest graduates in music. In 1520 he was in France at the Field of the Cloth of Gold with Henry VIII and the royal singers. Among his preserved church music (some incomplete) are 6 masses, 2 magnificats, 13 motets, etc., and he also wrote secular part-songs for 3 voices.

Faz, see FEZ.

Fazogil, mountainous dist. of the Sudan, which is traversed by the Blue Nile. It produces gold, senna, gum, tamarinds, and ivory. Pop. about 500,000 (Funj negroes).

Faalty, the service or duty served by a tenant to his superior lord in feudal times. Lands were granted on the conditions of F., suit of court, and rent, it being stipulated that tenants and their heirs should take the oath of F. or fidelity to their lord, which was the feudal bond between lord and tenant; should attend the lord's courts and give assistance by serving on juries, etc.; and should pay certain ann. returns in military attendance, provisions, money, or whatever was required of them.

Fear, Cape, promontory on the Atlantic coast, forming the S. point of Smith Is., in the S. of N. Carolina. This is, stands at the mouth of Cape Fear R. and has a lighthouse on its W. end.

Fear, an emotion which is normally the response to a situation of danger. Physically it is characterised by a secretion of a substance called adrenalin into the blood stream from the suprarenal glands. This produces observable effects on the circulation of the blood of which the most noticeable is pallor due to contraction of the minute blood vessels in the skin. These changes may be regarded as a physical preparation for meeting the dangerous situation, e.g. the lessened blood supply to the skin reduces the risk from bleeding. There is also release of glycogen from the liver which increases the physical effort that can be made to avoid danger. The impulse towards such escaping behaviour is the conative element in F. On the subjective side there is a distinctive and unpleasant system of feeling, and the escaping behaviour is reinforced by the tendency of the organism to seek reduction of this unpleasantness. F. of extreme strength is often called 'terror.' In terror, effective escaping behaviour tends to disappear and to be replaced by bodily collapse.

Many nervous disorders are characterised by *anxiety* or neurotic F. In such states the emotion of F. develops without external cause. Methods of psychotherapy such as psycho-analysis may be needed to overcome the disabling effects of neurotic F. Neurotic F. may also be reduced by the surgical operation on the brain of pre-frontal leucotomy. See C. Darwin, *The Expression of the Emotions in Man and Animals*, 1873; W. B. Cannon, *Bodily changes in Pain, Hunger, Fear and Rage*, 1915; S. Freud, *Inhibitions, Symptoms and Anxiety*, 1936.

Feast, or Festival. Throughout the whole world, wherever the general or official religion of the country has been dear to

the whole of the nation, the fixed state festivals have been associated with religion. Probably the Persians are alone among the world's nations in having no regular feasts, and this condition of theirs is artificial rather than natural. Egypt had many festivals, days consecrated to the Nile, Osiris, Ptah, and all her countless deities. The Hindu still observes his ancient festivals in the ancient way, except that he no longer offers human sacrifice. The earliest account of Gk festivals—that in the *Iliad*—speaks of 2 alone, but in later times these increased greatly in number. The expenses of the festivals were met from the public purse. In the later days of the Rom. empire the city revelled in innumerable feasts, not only of her own ancient gods, but also of the deities imported from the E. Different feasts became important at different times, but we may name the *Sementinae*, the festival of the seed-time in January; the *Lupercalia*, in honour of the god Pan; and the *Saturnalia*. Almost all of these festivals were celebrated by the pagan world with phallic ceremonies. The Hebrews, however, kept their feasts, described in the O.T., with the strictest purity. (See PASSOVER; PENTECOST; PURIM.) The Christian Church associated some of her festivals with the Jewish and some with the old pagan festivals, to which she gave a new, purified, and spiritual significance. See M. Dresser, *De Festis diebus*, 1590; J. B. Tillot, *Mémoires pour servir à l'histoire de la Fête des Fours*, 1741; T. Thistleton Dyer, *British Popular Customs*, 1911; W. Mead, *English Medieval Feasts*, 1931; F. Martin, *Observing Natural Holidays and Church Festivals*, 1940. See also under the names of particular feasts.

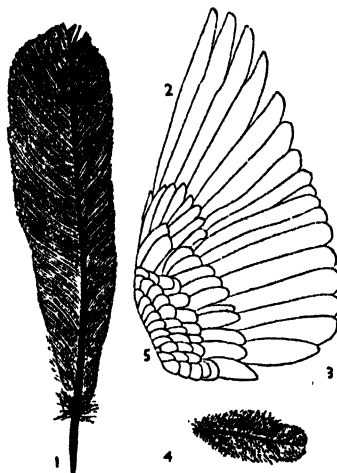
Feather Grass, see STIPA PENNATA.

Feather River, in N. central California, U.S.A., trib. of the Sacramento, which it joins about 18 m. above the city of Sacramento. It has a length of 80 m., and is navigable for steamers to Marysville. Gold is found on its banks.

Feather-star, or **Sea-lily**, popular name of Crinoidea (q.v.), a class of Echinodermata. The commonest species is *Antedon roseacea*.

Feathers, horny outgrowth of the skin which is peculiar to birds, and which corresponds to the scales of reptiles and the hair of mammals. F. as a rule consist of 2 main parts, axis and barbs, the former of which is divided into the quill, which is bare and hollow, and the shaft, which bears the barbs. The quill is embedded in the skin, and has at its base a small hole through which the nutritive sap passes during the growth of the F. The barbs which constitute the vane are lath-shaped and taper to a point, and each one supports a series of out-growths known as barbules, so that each barb is like a tiny feather. As a rule the barbs are linked to each other by means of the barbules, but in the running birds, e.g. the ostrich, they are free, hence the familiar loose plume. Many F., too, have an 'aftershaft' or second shaft springing from the under side near where the quill passes into the true

stem. This is as a rule small, but in some birds, viz. the cassowary and emu, the aftershaft is as large as the mainshaft. There are sev. kinds of F.: contour F., which form the general outline of the body and of which the 'flight F.' are most developed; down F., which are hidden by the contour F., and often form a very thick covering, as in gulls and ducks; filoplumes, which are found in all birds in clusters at the bases of the contour F.; and powder-down F., which occur in patches, especially in birds of the heron tribe, and exude a fine dust or powder which gives a peculiar bloom to the plumage. As



1, quill of pigeon; 2, quill feathers; 3, left wing of thrush; 4, contour feather of pigeon; 5, contour feathers

regards the colour of F., it is usually most prominent in the male birds. F. have been put to various uses. Of these perhaps the chief is their employment for stuffing beds, cushions, and quilts, and for this the F. of the eider-duck are most highly esteemed, those of the goose and swan coming next. F. are also used as quills for writing, and for personal adornment.

Featherstone, urb. dist. in the Pontefract parl. div. of the W. Riding of Yorks, England, about 2½ m. from Pontefract. Large collieries are in the neighbourhood, and these afford employment for the inhab. Some miners were shot dead during a riot in 1893. Lord Bowen and his fellow-commissioners in the report on the F. riots dealt with the duty of soldiers called in to suppress riots and this report is the *locus classicus* on the point. (Parl. Paper, 1893-4, c. 7234.) Pop. 14,080.

Featherweight, see PAPER.

Febronianism, powerful movement started in 1763 in Germany by Johann Nicholas von Hontheim (1701-90) under the pseudonym of 'Justinus Febronius' with the object of restricting the papal power, and of giving independence to the national Churches.

Febronius, see HONTHEIM, JOHANN NICHOLAUS VON.

February, 28th month of the year, containing 28 days in ordinary years, but 29 in leap years. The name is derived from Lat. *februa*, a Rom. festival of purification held on the 15th of the month.

February Revolution: 1. See FRANCE—History.

2. 1917, the fall of the Russian monarchy and its replacement by the 'double power' of the Provisional Gov. (q.v.) and the Soviets of Workers' and Soldiers' Deputies (see SOVIETS). The country's loss of confidence in Nicholas II and his gov. was such that a few negligible disturbances in the cap. induced him to abdicate. The changeover was peaceful throughout the country and was welcomed by the majority of the people, but the task of democratic reconstruction proved too difficult for the country in the middle of the war, and it failed to stand up to the small but determined party of Bolsheviks, who seized power in October. See also DUMA; KERENSKY; L'VOV; NICHOLAS II; OCTOBER REVOLUTION; A. F. Kerensky, *The Catastrophe*, 1927; M. T. Florinsky, *The End of the Russian Empire*, New Haven, 1931; L. Trotsky, *The History of the Russian Revolution*, 3 vols., 1932; Sir B. Pares, *The Fall of the Russian Monarchy*, 1939; W. H. Chamberlin, *The Russian Revolution*, vol. 1, N.Y., 1954; N. Sukhanov, *The Russian Revolution*, 1955.

Fécamp, Fr. seaport and watering place, in the dept of Seine-Inférieure, on the Eng. Channel, about 22 m. N.E. of Le Havre. It is on the R. Fécamp, and occupies the bottom and sides of a narrow valley opening out between high cliffs. It grew up around a 7th-cent. nunnery, later a Benedictine abbey. It is said that the Benedictine liquor, for which the tn is famous, was first distilled in the 16th cent. by the monks from herbs gathered on the cliff-tops of F. The abbey church of La Trinité dates from the 12th cent. Fishing is important and includes cod-fishing in Newfoundland; there is boat-building, and there are sugar refineries and tanneries. Pop. 17,000.

Fechner, Gustav Theodor (1801-87), Ger. psychologist, b. Gross-Särchen, near Muskau, Lower Lusatia. He graduated in medicine, 1822, but turned to physics and was appointed to the chair of that subject at Leipzig in 1834. He resigned through ill-health in 1839. He recovered and spent the rest of his life in the study of psychology and general science. He was one of the founders of experimental psychology. He applied mathematical physics in his investigation of the physiology of sensation and stated E. H. Weber's law in its modern form—in a series of sensations the stimulus has to

increase in geometrical proportion if the increase in sensation is to be sensed ('Fechner-Weber law'). He wrote the first treatise on psychophysics (*Elemente der Psychophysik*, 2 vols., 1860); his *Vorschule der Aesthetik*, 1876, is memorable for its contributions to the experimental psychology of aesthetics. *Ätiomenehre*, 1845, describes the materialism of things, *Nanna*, 1848, the soul-life of plants, and *Zendavesta*, 1851, star-life. He also investigated the theory of colour. An account of his philosophy is in W. James's *A Pluralistic Universe*, 1909. See lives by W. Wundt, 1901, K. Lasswitz, 1910, and I. Hermann, 1926.

Fechter, Charles Albert (1824-79), Fr. actor, b. London. He made his début at the Comédie Française as Seide in Voltaire's *Mahomet*, after which he went to Berlin, where he achieved great fame by playing the part of Armand Duval in *La Dame aux Camélias*. In London his impersonations of Hamlet and Othello were extraordinary triumphs. He did much to improve stage settings and effects.

Feciales, or **Fetiales** (etymology uncertain), a college of 20 priests holding office for life in anc. Rome. Their duty was 'to maintain the laws of international relationship.' When a state was considered to have acted in a manner hostile to Rome, 2 members of the college were sent to make a formal demand for redress. If this was not forthcoming within 30 days, the F. reported back to Rome; and if war was declared they crossed the enemy border and cast a twin-pointed javelin of cornel wood. Somewhat later, in order to avoid long journeys for the performance of this latter rite, a column (*columna bellica*) was erected at Rome to represent hostile ter., and into this the javelin was flung. F. also performed certain rites at the conclusion of peace-treaties.

Fecundation, see FERTILISATION.

Federal Bureau of Investigation (F.B.I.). Created in 1908 as the B. of I., a branch of the U.S.A. Dept of Justice, it served at first only the justice dept. In 1924 J. Edgar Hoover became its director, and Congress increased the scope of its duties; it was reorganised in 1934 as the Div. of I, in the Dept of Justice. In 1935 it received the designation of the F. B. of I. It now investigates violations of all F. laws, except counterfeiting and postal, customs, and internal revenue offences, with special emphasis on such crimes as sabotage, conspiracy, and treason. Its H.Q. are in Washington, and in 1955 it had offices in 50 cities of the U.S.A. and Puerto Rico, Hawaii, and Alaska.

Federal Council of Evangelical Free Churches, an organisation representing most of the Protestant denominations in the U.S.A., formed in 1908 to act in matters of common interest to the constituent churches. The council acts through commissions. Its objects include social service, research and education, the improvement of industrial relations, the promotion of international justice, and the improvement of relations with the

negre pop. The council also acts as the liaison between the churches and such national social agencies as the Red Cross and the Child Welfare (q.v.) Movement.

Federal Deposit Insurance Corporation, U.S.A. Gov. agency estab. in 1933 to insure D.s up to \$5000 (later \$10,000) in all member banks of the F. Reserve System and in qualifying non-member banks, with an ann. assessment on each bank. In 1955 the D. I. fund, representing accumulated assessments and investment income in excess of all past losses and expenses, was \$1,590,540,667.

Federal German Republic, rep. comprising the W. Ger. *Länder* of the former U.S., Brit., and Fr. zones of occupation (see *GERMANY, History*), with an area of 94,820 sq. m. and a combined pop. of 52,100,000 people (1955 estimate). The former W. zones of Berlin (186 sq. m.) are also part of the F. G. R. Its constitution, which is of federal form and owes much to Brit. parl. precept and procedure, was approved on 12 May 1949 by the Amer., Brit., and Fr. military governors and ratified by a two-thirds majority of the constituent *Länder* soon afterwards, Bonn being chosen by the parl. council as the seat of gov. The rep. came into existence on 23 May, when the basic law or constitution was signed by members of the parl. council in the presence of the Allied military governors (thereafter to be called commissioners). First elections to the Bundestag (q.v.) or Lower House of the F. G. Parliament were held on 15 Aug., the Christian Democrats emerging as the strongest party. Theodor Heuss (q.v.) was elected first president of the rep. and Konrad Adenauer (q.v.), leader of the Christian Democratic Union, was elected first F. chancellor (16 Sept.). The first gov. of the rep. was a Right-wing coalition. In the declaration of policy of his gov., 20 Sept., Adenauer voiced the determination of his ministers to co-operate closely with the W. powers. In retaliation for the institution of the F. G. R., an E. Ger. State or 'German Democratic Republic' (q.v.) was estab. under Russian auspices in the E. zone of Germany in Oct. 1949. In their note of 1 Oct., protesting against the formation of the F. G. R., the Soviet Gov. alleged that the Brit. Gov. had violated the Potsdam agreement (see *EUROPE, History*), as well as the decisions of the council of foreign ministers at Paris and must assume responsibility for splitting Germany and delaying the conclusion of a peace treaty. In reply the Brit. Gov. pointed out that it was only when the Soviet Gov. refused to treat Germany as a unit in accordance with the decisions of the Potsdam conference that the Brit. Gov. was compelled, in conjunction with the govs. of the U.S.A. and France, to unify Germany in so far as it lay within their power and to take progressive steps towards the unification of their respective zones.

The new rep. was soon playing an active part in W. European affairs. It was admitted to O.E.E.C. in 1949; and became a full member of the Council of Europe in

1951. It was one of the founder members of the European Coal and Steel Community. Economically, the F. G. R. prospered. It did not have the rearmament burden of the other prin. W. countries; and, increasingly freed from post-war restrictions, its industries boomed. In May 1952, for example, the F. G. R. was the largest creditor in the European Payments Union; and W. Ger. manufacturers competed successfully with those of other European countries. Adenauer's gov. fully supported the F. G. R.'s proposed participation in W. European collective defence; and this subject, raising the question of a recreated Ger. Army and possible conscription, caused considerable controversy in the rep. over the next few years, and in many other countries, especially France, where the prospect of a new Ger. Army was viewed with much popular misgiving, in the light of past hist. The Ger. Social Democrats were opposed to the F. G. R. tying itself militarily to the W., primarily because they claimed that this would prejudice any chance of future Ger. reunification with the Ger. Democratic Rep.; and this fear was played on increasingly by Soviet propaganda. The Social Democrats under Schumacher and, after his death, his successor, Ollenhauer (q.v.), kept up a sustained campaign, but Adenauer had the necessary majority to carry through his policy, with only minor modifications. In the elections of 1953 his party increased their majority.

In 1952 it was agreed that on F. G. R.'s formal joining of the European Defence Community (E.D.C.) the Allied occupation should end, although Allied troops would continue to be stationed in the R. for Ger. and European defence purposes. In 1954, however, France rejected E.D.C. The London and Paris agreements which followed resulted in the F. G. R. being invited to join N.A.T.O. and officially restored to the rep. full sovereignty. Fr. distrust of the Ger. rearmament that this involved was allayed by various safeguards. As a result, Western Union, of which the F. G. R. was a member, came into being in its present (1957) form on 7 May 1955; and 7 days later the F. G. R. formally joined N.A.T.O. A small regular army was soon being built up; but conscription was not brought into being until 1956-7. In 1955 Adenauer visited Moscow. As a result, diplomatic relations were estab. between Russia and the F. G. R. and Russia agreed to send back to Germany sev. thousand Ger. prisoners still detained in Russia. When in 1955, against Adenauer's advice, the Saarlanders voted against 'Europeanisation', and by implication, in favour of union with the F. G. R., relations between France and the F. G. R. were temporarily strained. Agreement on the Saar was eventually reached, however, as a result of which the Saar was united to the F. G. R. at midnight on 31 Dec. 1956. Early in 1957 the F. G. R. was still enjoying great economic prosperity. There were signs, however, that the

relative industrial tranquillity of the preceding years might be ending, as unions began to formulate increasingly stringent demands on pay and conditions of work. Though Ger. reunification seemed as distant as ever, Russian intransigence on the subject at Geneva in Nov. 1955 giving little hope of any solution to the problem in the foreseeable future, it still remained the ideal of every F. G. citizen, and there were increasing signs of a popular demand for the return to the future reunified Germany of the 'lost' provs. beyond the Oder-Neisse line. In 1957 Adenauer was again returned to power at the general election. See H. Mangoldt, *Das Bonner Grundgesetz*, 1950; A. Horne, *Back into Power*, 1955; A. Grosser, *Western Journey*, 1955; and A. C. Wallich, *Main Springs of the German Revival*, 1956.

Federal Reserve System, U.S.A., estab. by Congress in 1913 to prevent regional money panics and other monetary problems such as had arisen from time to time with the development of the national economy since the Civil war. It consists primarily of 12 regional banks and 24 branches, each with its own board of directors which has authority to provide for flexible operations and to meet regional needs. The S. as a whole is under the supervision of a board of 7 governors appointed by the President with the advice and counsel of the Senate. Assisting the F. R. Board are the F. Open Market Committee and the F. Advisory Council. The S. is, in effect, the central bank of the U.S.A.: it is the fiscal agent for the Treasury; it issues the currency; it maintains a nation-wide S. for clearing cheques between banks; and it controls the supply of money and credit through its power to regulate the R. that banks hold against deposits and by setting the rate banks pay for borrowing at the regional F. R. banks. While the F. R. S. is completely under the control of the U.S.A. Gov., the cap. of the R. banks was supplied by member banks through assessments. Membership in the S. is required of all national (federally chartered) banks, and state-chartered banks that qualify can voluntarily become members. Of the nation's 14,186 unit banks, 6476 were members of the S. at the end of 1956. Aggregate assets of member banks were \$178,043,000,000 compared with total U.S.A. banking assets of \$242,940,000,000. See also **BANKING in the U.S.A.**

Federal Trade Commission, an organisation set up by the Amer. Gov. in 1914 to check the growing menace of trusts and monopolies (see **Trusts—Commercial**). The struggle between the gov. and the trade combines ever since 1890, when the Sherman Act was passed, has been a record of legal victories for the gov. that have been practically nugatory; and the action of 1914 was evidently an endeavour to control and influence powers that could not be broken. After the First World War the Wells-Pomerane Act mitigated some of the older restrictions of

anti-trust legislation by legalising the alliance of great firms with each other for the purpose of marketing their goods in foreign lands. The F. T. C., which was estab. to prevent unfair business practices in inter-state commerce, has investigated alleged violations of the anti-trust laws. See I. L. Scharfman, *The Inter-state Commerce Commission*, G. C. Henderson, *The Federal Trade Commission*, and T. C. Blunsdell, *The Federal Trade Commission*.

'Federalist, The', was a collection of essays pub. in 1787-8 in New York, at the instigation of Hamilton, to defend the new gov. They appeared in the semi-weekly *Independent Journal* of New York under the above title, and were written by Alexander Hamilton, James Madison, and John Jay. There were in all 85 essays, which were collected and subsequently pub. in book form. The collection is still regarded as a classic text-book of political science. See **Everyman's Library** ed.

Federalist Party, The, was in power in the U.S.A. 1789-1801; d. about 1820. Its chief leaders were Alexander Hamilton and John Adams; Washington was closely identified with it. The P. reorganised the executive depts, created the federal judiciary and the territorial system, and introduced excise laws, a U.S.A. bank, a protective tariff and bounty system to develop manufs. and agriculture, and a postal system.

Federated Malay States, see **MALAYA, FEDERATION OF**.

Federation (Lat. *foedus*, a league), a union between 2 or more states, in which each retains its autonomy, while a central representative gov. controls matters of general concern. The Amphictyonic League of ancient Greece, the earliest on record, seems to have been religious rather than political. Among other Gk leagues were: the Thessalian, very powerful about 370 BC; the Aetolian, a well-organised F. composed of tribes living N. of the Gulf of Corinth, having a general assembly which met yearly, and a permanent committee acting as an executive gov.; the Achaean, which became a great political force about 251 BC: originally comprising 10 cities of Achaia, it ultimately included Athens, Megara, Aegina, and almost all the Peloponnesus; this, too, was a real F. The Hanseatic League was first formed by the cities of Hamburg and Lübeck about AD 1247 to protect their commerce against pirates and robber-barons. Gradually over 80 tns joined them, and the Hansa F. (Old Teutonic *hansa*, a defensive league), though never formally recognised by the empire, was for centuries a great power. It held courts of justice, enforced obedience among its members, and bargained and fought with kings and princes, on one occasion equipping a fleet of 248 ships with 12,000 men. The Hanseatic Diet, held triennially at Lübeck, was not dissolved until 1630. Modern civilisation with its improved means of communication and transport, and with many highly organised communities capable of political combination on equitable terms, has facilities for more extensive F.s. **Bavaria**

and Saxony could federate with Prussia, but no power of old could federate with Rome, and the holding together by mutual agreement of immense ters., like those of the U.S.A., would have been beyond human conception. But the principles remain the same. A F. is not a mere alliance from which either of the contracting parties can withdraw at will, nor is it a union in which one predominant power can assume control in local as well as general affairs. Safety and efficiency require a strong central gov., which must be fully representative, and must have command of foreign relations and of those internal matters which are of general concern, such as postal and telegraphic services, money, and national defence. But this central gov. cannot administer innumerable local details over immense areas or among thickly populated ters. with varying interests; therefore each federal country or state must have a large share of autonomy.

The rep. of Switzerland was first founded in 1307 by the men of Schwyz, Uri, and Unterwalden, and in about a century attained its present size, but remained communal rather than federal until 1848, when it was reorganised somewhat on its present lines. As the benefits of a solid gov. were realised, the powers of the federal parliament were strengthened in 1874, 1898, and again in 1907.

The medieval Ger. empire was a bulky and loose combination of states, sadly lacking in unity. It was broken up by Napoleon, but re-estab. with alterations in 1815. After the war of 1866 Austria was excluded, and in 1871 a federal empire was inaugurated at Versailles, with the king of Prussia as hereditary Ger. emperor. The abdication of the Kaiser and the monarchs of the other Ger. states in 1918 led to the formation of the new reps. of Prussia, Bavaria, Saxony, Württemberg, and others. But the F. of the Ger. states remained in being, under a president (Field-Marshal Paul von Hindenburg, who assumed office in May 1925); and later, under Hitler (q.v.), the last vestiges of autonomy of the sev. states of the Zollverein were merged in the Reich. For a thousand years the problem of unification versus federalism has been the main issue of Ger. hist. It has lost nothing of its poignancy under the quadripartite system of the occupying powers, and some indeed maintain that its solution is of prime importance for the future of Central Europe. But the problem of making F. living and workable is not confined to Germany. The adoption of federalist principles for the post-war reconstruction of the European Commonwealth was advocated by Winston Churchill as early as 1943.

Among the many national and geographical consequences of the First World War was the estab. of 3 new European countries which had many of the characteristics of federated states. These were: (1) Poland, which, before 1939, consisted largely of the ter. divided between Prussia, Russia, and Austria in 1772, and

reconstituted as a nation after 1918; (2) Czechoslovakia, a number of states or parts of states, of which the old kingdom of Bohemia is the chief, including roughly the Slav pops. that lie between Germany and Poland on the N. and Austria on the S.; and (3) Yugoslavia, consisting of the old kingdoms of Serbia and Montenegro, Croatia, Slavonia, and parts of the Banat, Bosnia, Herzegovina, Carniola, and Styria. Syria and Lebanon, consisting of the 4 states of Damascus, and Aleppo (q.v.), the Alaouites, and Lebanon are federated for certain purposes, but the constitution in each part is still in a rather unsettled condition.

The U.S.A. originally consisted of the 13 colonies which united in 1775 to free themselves from Brit. rule; to these others have gradually been added. The struggle between centralisation and local autonomy has led to sev. great crises in their hist. Excessive claims of state sovereignty put forward by Kentucky and Virginia in 1798 and by S. Carolina in 1832 almost led to fighting, and in 1861 the great Civil war broke out over the same question, the S. states refusing to obey the federal gov., and claiming the right to secede.

Included in the Brit. Commonwealth are 3 great federated colonies now called dominions. The dominion of Canada was the first example in history of a F. within an empire, free and autonomous, yet acknowledging the supremacy of the crown. The Commonwealth of Australia was constituted in 1901, the Union of South Africa in 1909.

Brazil and Argentina are both federal reps., with constitutions resembling that of the U.S.A.

In modern F.s some factors seem always to have been operative; the need for a common defence; resentment of foreign interference and a realisation that independence can be secured only through union; some political association of the constituent communities prior to their federal union either in a loose confederation (q.v.), as with the 13 Amer. states and the Swiss cantons, or as parts of the same empire, as with the Brit. dominions; the hope of economic advantage, especially by way of protective tariffs; geographical propinquity; and similarity of political institutions. These factors were operative in America, Canada, Australia, and Switzerland. They indicate how far a federal form of gov. can be expected to succeed in India, the states which form the Arab League, Brit. Malaya (or the Malayan Union), Indonesia, and Fr. Indo-China. Some factors are unexpectedly absent: thus community of language, or of race, or religion or of nationality has not been accounted a probable essential pre-requisite of the desire for union. Common language or race contributed to union in the U.S.A., Australia, and Germany; common nationality operated strongly in Italy and Germany. Conversely, in Canada and Switzerland F.s were formed in spite of diversity of language and race. See also CONFEDERATION.

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Federation of British Industries, voluntary association, founded in 1916 'for the encouragement, promotion and protection of British Industries of all kinds.' Membership comprises individual firms (numbering 7500 in 1956) and trade associations (286). The F.B.I.'s functions are (a) to formulate and promote policy on all matters affecting Brit. industry as a whole, except labour matters (e.g. taxation, transport, technical legislation); (b) to provide members with individual services (especially in the export field, e.g. appointment of agents, etc.); (c) to promote activities within industry itself for the common benefit (e.g. education, research, trade promotion overseas). The F. publishes *FBI Review* (monthly), *FBI Register* (an ann. classified list of members and their products), *Fuel Economy Review* (ann.), and about 12 booklets a year on miscellaneous subjects. It has 14 dist. offices in the U.K. and representatives in 140 centres overseas; its subsidiary company, Brit. Overseas Fairs, Ltd., has organised all-Brit. trade fairs at Bagdad, 1954, and Copenhagen, 1955, and the Brit. pavilion at the Damascus International Fair, 1956. H.Q. are at 21 Tothill Street, London, S.W.1.

Federation of Rhodesia and Nyasaland, see RHODESIA AND NYASALAND.

Federici, Camillo (1749-1802). It. dramatist, whose real name was Giovanni Battista Viassolo, b. Gressio, Piedmont. He was educ. at Turin, and spent the early part of his life on the stage, but in 1773 settled at Padua and devoted himself to literature. He acquired a great reputation by his comedies, most of which were melodramatic in character. His *Opere teatrali*, 10 vols., were pub. in 1794-7, and another ed. in 26 vols. at Florence in 1826.

Fedin, Konstantin Aleksandrovich (1892-), Russian novelist, a Fellow Traveller (q.v.). His *Cities and Years*, 1924, revived the realistic novel in post-revolutionary Russia. Later he wrote *The Brothers*, 1928, *The Abduction of Europe*, 1934-5, *First Joys*, 1945, and *An Extraordinary Summer*, 1948. His main themes are the Russian revolution and civil war and the impact of revolutionary Russia on Europe.

Fëder, the name of 3 Russian tsars.

Fëdor I (1557-98), son of Ivan the Terrible, last of the House of Rurik (see RURIKIDAE), was married to a sister of

Boris Godunov (q.v.), and succeeded his father in 1584. He was of weak intellect and left the gov. of the country to Godunov. Important events of his reign were the law forbidding the movement of peasants from small to large estates and the estab. of the Moscow Patriarchy (1589).

Fëdor II (1589-1605), son of Boris Godunov, succeeded his father in 1605, but in a few weeks was deposed in favour of the usurper 'the false Dmitry' and murdered.

Fëdor III (1661-82), the last tsar of Muscovy, eldest son of Alexis Mikhaylovich, succeeded his father in 1676. An intelligent and advanced ruler, he endeavoured to modernise the gov. of the country and abolished the system of appointing high officials according to their birth and breeding.

Fëdorov, Ivan Fëdorovich (d. 1583), first Russian printer. In 1563 F. printed the first book in Moscow. He fled from Muscovy to Lithuania and Poland where he continued his work.

Fëdorov, Nikolay Fëdorovich (1828-1903), Russian thinker. He believed that the future ideal society, classless and universal, would be based on the conquest of the blind forces of nature and would concentrate all its energies on the supreme task of the resurrection of all the dead. Many of F.'s ideas have enjoyed great popularity in Soviet Russia and have influenced scientific research (see VERNADSKIY), technical development (e.g. towards the utilisation of solar energy and inter-planetary travel), various organisations (Local Studies Movement), and even gov. policy (the estab. of labour armies in 1920). See N. Lossky, *The History of Russian Philosophy*, 1951; V. V. Zenkovsky, *A History of Russian Philosophy*, vol. ii, 1953.

Fëdra, see INGHIRAMI, TOMMASO.

Fee, **Fee Simple** (from Lat. *feodum*), in Eng. law, is a freehold estate or interest in land. Theoretically all land is held of the sovereign—a concept inherited from the feudal systems of land tenure. Under that system tenants in F. held their land subject to certain feudal duties such as knight service and payment of aids. The types of F. or F. S. are as follows: (1) *Fee simple absolute in possession* means the absolute ownership of freehold land in perpetuity which enables the owner to dispose of it by will or deed and entitles him to everything in, on, or over the land. (2) *Determinable fee* is a F. S. which will determine on the occurrence of a specified but not inevitable event, e.g. the settlement of freeholds 'to A until she marries.' (3) *Conditional fee* is created by a condition attached to the grant of land, e.g. 'to B on his marriage.' (4) *Fee tail* is an estate in land limited to the issue of the person to whom it is granted (i.e. the tenant in tail). (5) *Base fee* is a particular type of determinable F. which is created where a tenant in tail, not yet in possession, bars the entail by deed without first obtaining the consent of the protector of the settlement. See also ENTAIL.

Fee Law, see **FIEF**.

Feeble-minded, see **MENTAL DEFICIENCY ACTS**.

Feeding, see **FOOD AND DIET**.

Feeling, see **EMOTION**.

Fehling's Solution, S. which is used for the detection and estimation of glucose and other 'reducing' sugars. It consists of a S. of cupric sulphate mixed with alkali and potassium-sodium tartrate. For use a small quantity of the S. is placed in a test tube and diluted with water. It is then boiled for a few seconds, after which the fluid to be tested is added drop by drop until its bulk is equal to that of the diluted fluid. If a reducing sugar (such as glucose but not sucrose, cane-sugar) is present a yellow precipitate of finely divided cuprous oxide is thrown down, which subsequently becomes ordinary red cuprous oxide.

Fehmarn, Ger. is. in the Baltic Sea, belonging to the *Land* of Schleswig-Holstein (q.v.). It is separated from Lolland (q.v.) by the F. Strait, and is mostly grazing land. Its chief tn is Burg. Area 72 sq. m.; pop. 10,000.

Fehmle Courts, tribunals, often, but not always, secret, which became widespread in Westphalia about the 14th cent., and afterwards spread throughout Germany. Important cases were tried in secret, capital crimes being punished by hanging, no culprit, however powerful, being secure. Implicit obedience was exacted from all members, who were known to each other by secret signs. The power of the F. C. declined after the 16th cent., but they were not officially abolished until 1811. The illegal Free Corps revived the F. C. in Germany in a bogus form after the First World War.

Fehrbellin, Ger. tn in the dist. of Potsdam, on the Rhin canal, 30 m. NNW. of Potsdam (q.v.). In 1675 the Prussians here defeated the Swedes under Wrangel (q.v.). Pop. 3800.

Fehrenbach, Konstantin (1852-1926), Ger. statesman, b. Wellendingen, Baden. He became a lawyer. From 1903 he was a member of the Reichstag and became its president in June 1918. He presided over the National Assembly at Weimar, Feb. 1919, and became chancellor at the head of a minority gov., 1920-1.

Feljo y Montenegro, Benito Jeronimo (1676-1764), Sp. scholar, became a Benedictine monk at the age of 12. He is regarded as the initiator of educational reform in Spain. He boldly attacked the dialectics and metaphysics then taught everywhere in his native country and maintained Bacon's system of induction in the physical sciences. He pub. *Teatro critico universal*, 1751-9, and *Cartas eruditas y curiosas*, 1753.

Fellding, Robert (1651-1712), rake, known as 'Beau Fellding,' was a member of the Denbigh family, and attached to the court of Charles II. He was noted for his numerous love-affairs, his extravagance, and his profligacy, and was satirised by Swift and Steele. He commanded a regiment in Ireland for James II.

Fellding, Rudolph Robert Basil Aloysius Augustine, see **DENBIGH, 9th EARL OF**.

Fellding, tn in North Is., New Zealand, 99 m. NE. from Wellington. It has dairy factories, freezing works, flour mills, and an agric. high school. Pop. 6780.

Fels (Fheis), term applied to festive gatherings organised locally all over Ireland for the preservation of Irish culture. Competitions are held in language, music, singing, dancing, drama, etc. The F. of Tara (q.v.), which originated 7 centuries BC, was mainly a national and political assembly, and was due to meet every 3rd year for the purpose of 'preserving the laws and rules,' but might be called at other times. After the proclamation of the laws the proceedings were festive in character. The last regular F. was held at Tara in AD 560.

Feisal (Faisal) (1883-1933), king of Iraq, b. Rahab, near Taif; son of Husain ibn Ali—afterwards grand shérif and emir of Mecca, and, later, king of the Hedjaz; descended from Hasan, eldest son of Mohammed's daughter Fatima. In 1913 he became deputy for Jiddah in the Turkish Parliament, and took part in the Arab national movement. He was at Mecca when the First World War broke out. With one of his brothers he raised the flag of revolt near Medina in 1915; and, having failed in an attack on that city, he became chief of his father's N. army. His forces, co-operating with Allenby, marched from Medina to the E. bank of the Jordan. He met Allenby 3 Oct. 1918, and the same day rode into Damascus in celebration of the overthrow of Turkish power in Syria. He attended the peace conference in Paris, Feb. 1919. In Mar. 1920 he was back in Damascus, where his appointment as king, and the independence of Syria, were proclaimed. But next month Syria was 'mandated' to France; and either F.'s appointment was unpopular, or opponents contrived to make it seem so (he had publicly expressed sympathy with Zionism), and Fr. troops entered Damascus, 25 July. F., deposed, left for Haifa, and began to turn his attention to Mesopotamia, otherwise Iraq, for the throne of which his brother Abdullah (now king of Transjordan) had hitherto been a somewhat passive candidate. A referendum of Iraq notables resulted in a huge majority for his election; he was enthroned king, 23 Aug. 1921. In 1927 he came to London to negotiate the admission of Iraq to membership of the League of Nations. The Brit. Gov., as mandatory, had by then substituted a treaty arrangement with Iraq in place of the mandatory regime, but full independence and membership of the League did not come until 1930, when a new treaty of alliance was concluded between Iraq and Great Britain. F. d. in Switzerland and was succeeded by his son Ghazi, who was killed in a motor accident in 1939. See Sir T. Comyn-Platt, 'King Feisal of Iraq,' in *Empire Review*, Nov. 1926; Mrs Stewart Erskine, *King Feisal of Iraq*, 1933; Sir H. Young, *The Independent Arab*, 1933. See also **IRAQ**.

Feith, Rhijawis (1753-1824), Dutch poet and writer, b. Zwolle. He was educ. at Harderwijk and at the univ. of Leyden, and became mayor of Zwolle in 1787. Influenced by Goethe, Klopstock, and Wieland, he wrote sentimental novels, which have been very much criticised for their morbid melancholy, as well as tragedies, didactic poems, and lyrics. Of his novels may be mentioned *Julia*, 1783, and *Ferdinand and Constantia*, 1785, both written in emulation of *Werther*, and his best tragedies are *Thirza*, 1784, *The Patriots*, 1784, *Lady Jane Grey*, 1791, and *Inez de Castro*, 1793. Among his poems are *Old Age*, 1802, *The Grave*, 1792, a didactic poem, and *Odes and Miscellaneous Poems*, 1796-1814.

praise of Voltaire. He also wrote descriptions of Versailles, La Trappe, and royal art collections.

Felidae, name given to an extensive family of carnivorous mammals. They are characterised by a lithe body, soft and often beautifully marked fur, feet provided with cushion-like pads and retractile claws, and short, strong jaws with formidable teeth. *Felis domesticus*, the domestic cat, and *Panthera leo*, the lion, are typical and widely contrasted species; others are *P. tigris*, the tiger; *F. pardus*, the leopard; *P. onca*, the jaguar; *P. concolor*, the puma; *F. silvestris*, the European wild-cat, and *F. ocreata*, the Egyptian cat, which is regarded as the parent of our own domestic species. *Lynx*, sometimes



FELIDAE: LION (*Panthera leo*)

Féjér County, see SZÉKESFEHÉRVÁR.

Felaniche, see FELANITX.

Felanitx, or **Felaniche**, Sp. tn in Majorca (q.v.), near the E. coast. It has an ancient pottery industry, and a trade in wine, fruit, and cattle. Pop. 13,000.

Feldkirch, Austrian tn in the prov. of Vorarlberg, on the Ill. Overlooking the tn is a 13th-cent. castle on a high rock, and there is a Gothic par. church. There are textile, timber, and paper industries. Pop. 15,300.

Félegyháza, see KISKUNFÉLEGYHÁZA.

Félibien, André (1619-95), Fr. architect and historiographer, b. Chartres. Went to Rome as secretary to the Fr. ambas. There he came in contact with writers and artists while translating Cardinal Barberini's life of Pius V. and thus turned to artistic subjects. With the patronage of Colbert and Fouquet, he was successively historiographer of buildings, secretary of the Académie d'Architecture, and keeper of antiquities; but he devoted most of his life to writing. His *Entretiens sur les vies et sur les ouvrages des plus excellents peintres anciens et modernes*, 1686, won the

termed *F. lynx*, is more frequently regarded as a distinct genus of *F.*, with *L. pardinus*, the pardine lynx, and *L. canadensis*, the Canadian lynx, as the most familiar species.

Felis (the cat genus), see CARNIVORA: CAT; FELIDAE; LEOPARD; and TIGER.

Felix, name of 5 popes or anti-popes: *St Felix I*, reigned from 269 to 274. He is said to have suffered martyrdom in the persecutions under Aurelian. *Felix II*, anti-pope, was raised to the papal chair in 355 on the banishment of Liberius, who refused to condemn Athanasius, but was expelled from Rome on his return in 357. He was regarded as a saint and martyr, and d. in 365. *St Felix III*, pope, ancestor of Gregory the Great, succeeded to the papal chair in 483 and d. in 492. He communicated the Patriarch of Constantinople, and so produced the first schism between the E. and the W. Church. *St Felix IV* (526-30) was elevated to the papal see by Theodoric, contrary to the wishes of the clergy and people. *Felix V* (1440-9) was the name assumed by the anti-pope Amadeus VIII, duke

of Savoy, when he was elected by the council of Basel in 1439. He submitted to the lawful pope, Nicholas V, in 1449. He was the last of the anti-popes. He d. at Geneva.

Felix, St (3rd cent.), patron of Zürich, whose feast is celebrated on 11 Sept. He and his sister Regula, who is commemorated with him, were martyred near Zürich.

Felix, Antonius, Rom. prefect of Samaria, and afterwards procurator of Judaea (AD 52-60). Immediately on assuming this last office he married Drusilla, sister of Agrippa II and wife to King Azizus of Emesa, whom he had persuaded to desert her husband. St Paul appeared before F. at Caesarea (Acts xxiv). For a summary of the procurator's evil character, see Tacitus, *Annales* XII, 54; *Historiae* V, 9.

Felixstowe, tn of Suffolk, England, which is usually considered as having derived its name from a priory dedicated to St Felix, bishop of Dunwich, is situated on a peninsula between the rvs. Orwell and Deben in the SE. of the co. It is a well-known seaside resort, much frequented on account of its cliff gardens, fine beach, and boating and bathing facilities, 12 m. from the co. tn of Ipswich. It adjoins Harwich harbour, which was an important centre of naval activity during the First and Second World Wars. It is the H.Q. of the F. Ferry Sailing Club, and there are 10 other yacht clubs within 20 m. Pop. approx. 15,210 (1954).

Fell, John (1625-86), clergyman, b. Longworth, Berkshire, son of the dean of Christ Church, Oxford. In 1636 he gained a studentship at Christ Church and took orders. During the Civil war he held a commission as ensign for the king, and at the Restoration was made dean of Christ Church and chaplain to the king. In 1676 he was consecrated bishop of Oxford, also holding the deanery of Christ Church. He was an extraordinary disciplinarian, encouraged learning, and proved himself a capable administrator, but refused all interference. It was written of him that 'He was the most zealous man of his time, for the Church of England,' also 'that he was very rude, and most pedantic and pedagogical, yet still aimed at the public good.' He is chiefly remembered for the verses beginning 'I do not love thee, Dr Fell,' which Thomas Brown (q.v.) composed for him extempore under the threat of expulsion. He spent large sums of his own money on the building of Christ Church (q.v.). He wrote many learned and religious works, and is noted, too, for his services to printing and publishing.

Fell Pony, see HORSE.

Fellah, plural **Fellahin** (Arabic for ploughman), name applied to the peasantry of Egypt (q.v.). They preserve to some extent the blood of the anc. Egyptians; but the mixture of race due to long ages of inter-marrying with the various peoples who have occupied the country shows in the wide differences to be seen in their colouring, ranging from a deep bronze to almost white. Physically

the F. are a fine race; the men are powerfully built with well-shaped skulls, oval faces, and large, clearly-cut features; the women when young are often very graceful and beautiful. Most are Moslems by religion.

Fellenberg, Philip Emmanuel von (1771-1844), Swiss educationist, b. Bern. After distinguishing himself at the univ. of Tübingen he studied the life of the peasants and workmen of Switzerland, and was influenced by Pestalozzi (q.v.). In 1799 he bought the estate of Hofwyl, near Berne, and started an agric. college in conjunction with Pestalozzi, from whom he later separated. It was based on a new system of bringing all ranks of society close together by education, and in spite of the ridicule it first encountered proved a success.

Felling, urb. dist. in NE. Durham, England, on the S. bank of the R. Tyne, adjoining Gateshead. F. is in Jarrow parl. div. Industries include coal-mining, engineering, and the manuf. of paints. Pop. 26,000.

Fellow-feeling, see SYMPATHY.

Fellow Traveller, in Soviet Russia of 1920's, name given by Communists to those intellectuals (particularly writers) who accepted the Soviet regime but were not Communists. In current non-Communist parlance those who support or sympathise with Communists.

Fellowes, Edmund Horace (1870-1951), clergyman and musicologist, b. London. Attached to St George's Chapel, Windsor, since 1900. Hon. Mus.D. of Dublin (1917) and D.Mus. of Oxford (1938). He has written works on Byrd, and Orlando Gibbons, and ed. the complete series of Eng. madrigal and lute songs (68 vols.) and besides much Tudor church music.

Fellows, Sir Charles (1799-1860), archaeologist, b. Nottingham. In 1820 he became a member of the Brit. Association. In 1838 he went on the first of his 4 expeditions to Asia Minor. His second expedition resulted in the discovery of 13 anc. cities in Lycia. The fourth expedition was the most famous and satisfactory: it resulted in 27 cases of marbles, chiefly from Xanthus, being presented to the Brit. Museum. This pioneer among archaeologists penetrated to dista. unknown by Europeans, entirely at his own expense. He wrote sev. books on his travels. In 1845 he was knighted, receiving no other public acknowledgment of the work he had accomplished. Wm James Muller (d. 1845), the Eng. painter, accompanied F. to Lycia, and made many beautiful and interesting sketches of the anc. works of art.

Fellowship. At Oxford, Cambridge, and Trinity College, Dublin, Univs. the term is applied to a member of the foundation of an incorporated college, sharing in the gov. and receiving an income from the college revenues. F.s are conferred, generally through open examinations, on bachelors of art whose careers have been distinguished. There are prize F.s involving no collegiate duties, and official F.s which are attached

to the teaching and tutorial staff. Honorary F's are conferred on distinguished persons. The Dublin Univ. fellows hold their office for life. At first fellows were restricted to persons who took holy orders and were celibates; this was abolished in 1858. At Univ. College, London, and King's College, London, distinguished former students are elected as fellows of the college. A great many F.s are now awarded by other univs. and organisations as post-graduate research scholarships. They might be honorary or carry a money grant. The F.s often specify the area of research in which the recipient shall work. They frequently bear the name of the organisation or person founding the award.

Felitham, Owen, see FELTHAM.

Felo de Se (literally a felon on himself, i.e. a murderer of himself), the legal term for a suicide, hence used in verdicts where juries do not find evidence of temporary insanity. *See* SUICIDE.

Felon and Felony, in Eng. law, a legal term for a special but ill-defined group of criminal offences. Whether a particular crime is a felony, a misdemeanour, or a summary offence must be determined by reference to the common law and to various statutes. *See* CRIMINAL LAW.

Felsina, see BOLOGNA.

Felsite, term used by geologists for fine-grained igneous rocks of acid composition. They are composed chiefly of feldspar and quartz in very minute particles. In colour the rocks are usually of a reddish-yellow, and are hard and sometimes nodular. They occasionally contain porphyritic crystals of clear quartz, and are then known as quartz-F.s. The variety of formation of these rocks has led to considerable discussion, and it cannot always be determined whether F. is an original substance, or the result of devitrification of primary glass. They are divided up into granite porphyries, orthophyres, felsitic rhyolites, etc. The term soda-F.s. is used of fine-grained rocks containing large quantities of soda-feldspar.

Felspar (from Ger. *Feldspath*), important group of mineral silicates, forming prin. components of various plutonic and volcanic rocks. Lyell gives the minerals essential to granite (plutonic) in their order of importance as F., quartz, and mica, and the trachytic rocks (volcanic) are largely felspathic. The chief constituent of all F.s (sometimes over 60 per cent) is silica; alumina sometimes reaches 30 per cent, and there are varying proportions of lime and soda. F.s are classified according to their cleavage as monoclinic (including orthoclase, adularia, and sanidine) and triclinic (albite, anorthite, etc.). The sub-divs. are based on chemical composition and crystallography. F.s decompose when exposed to weather, forming various soils, among others china-clay. Kaolin, from which fine porcelain is made, consists of decomposed orthoclase. The F.s have a sp. gr. of from 2.55 to 2.75, and their hardness, 6 to 6.5, is less than that of quartz. Pure F. is colourless, but many varieties are finely tinted owing to the

presence of various minerals. Among these are: Amazon stone, a green F. found in Russia and U.S.A., this is often cut and polished; moonstone, a translucent variety known as adularia (hence its sheen is called adularescence), found in Ceylon; Labradorite, generally dull, but sometimes playing with brilliant blue, purple, and other tints, then very handsome when polished; sunstone, called aventurine from its golden spangled lustre, like that of aventurine glass, found in Queensland, Russia, and U.S.A. The colouring of red and grey granites is due to the F.s they contain.

Felsted, or Felstead, vil. of Essex, England, 4½ m. from Dunmow. The church, largely in the Transitional style, has a Norman tower. F. School (q.v.) was founded in 1564. Pop. 2010.

Felsted School, public school for boys, situated at F., Essex, founded in 1564 by Richard, 1st baron Riche, lord chancellor of England. In the 17th cent. it was well-known as a Puritan school, and 4 sons of Oliver Cromwell were educ. there.

Felstone, name given to volcanic rocks allied in composition to the granites. The name is also often used to describe and lavas allied to the Liparites or to Obsidians which have become devitrified. Certain Scottish rocks which were once classed as F.s are really devitrified trachytes.

Felt, fabric produced by the 'felting' or 'matting' together of fibrous materials, such as wools, furs, and some hairs. The hairs from wool are covered with serrations or minute hooks which can easily be forced together, so as to become 'matted.' Fibre F.s are interesting, as the art of felting preceded the art of weaving in the ant. civilisations of Asia. There are 2 classes of F., the woven F. and the fibre F. In the former selected wools are used, such as Saxony wool, and woven into a cloth that will endure the subsequent shrinking or felting; to obtain the heavier F.s, 2 or 3 woven cloths are stitched together before they are subjected to the process of shrinking. The material is passed between hollow steam-heated rollers which are kept moist and warm, and the fabric thus treated tends to shrink and thicken and become dense enough to resist water. Fibre F. is divided into the F. used for hats, impregnated F., and the ordinary F. For the manuf. of F. hats vegetable fibres, silk, hairs, furs, and wool are used; hair and wool being the most usual. The F. made for hats goes through the same process as other F.: for fur hat F.s, an air blast is used to carry fibres on to the required shape, and the F. is impregnated with stiffening agents. The prin. use for F. is for the linings of furniture, rubber shoes, slippers, as undercarpets, for steam engine packing, and covering steam hot-water pipes and all vessels which are to be insulated to prevent condensation, etc. The impregnated iron felt is a later development, used in the construction of bridges, etc., in the place of rubber. Asphalted F. is used for roofing, especially for wooden structures.

Feltham, or **Feltham**, Owen (c. 1602-1668), essayist, b. Mutford, Suffolk. He was noted for a vol. of essays entitled *Resolves, Divine, Moral and Political*, 1633. His writing was modelled on that of Bacon, and has a certain charm. Later eds. of *Resolves* include a collection of poems entitled *Lusoria, or Occasional Pieces*.

Feltham, large vil. and urb. dist. of Middx., England, about 4 m. E. of Staines, with nurseries and market gardens. The urb. dist. includes Hanworth, Bedfont, and Hatton. Pop. 44,830.

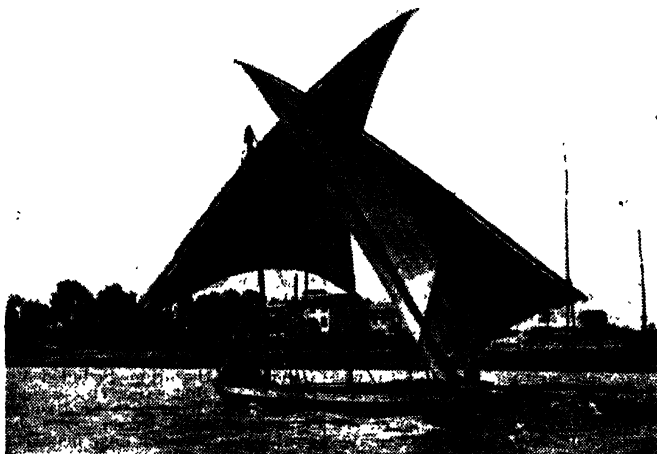
Felton, John (1595-1628), assassin, member of an old Suffolk family estab. at

Female Suffrage, see **WOMEN'S SUFFRAGE**.

Feme, O.F. word, the modern being *femme*, used in legal phraseology for 'woman'; *feme covert*, a married woman, i.e. protected by a husband, and *feme sole*, a divorcee.

Femern, see **FEHMARN**.

Feminism, belief in or advocacy of the influence of women in spheres conventionally reserved to men, or, more briefly, the movement for the equality of the sexes. The movement for extending the franchise to women in England had its intellectual genesis in the writings of John Stuart Mill. The great practical difficulty before



Canadian Pacific

A FELUCCA ON THE NILE

Playford. He served as a lieutenant in the army, and the rejection of an application to the duke of Buckingham (q.v.) for promotion bred a deep hatred. He finally went to Portsmouth and stabbed Buckingham dead. F. was hanged at Tyburn; on his way to the gallows the crowd blessed him publicly for delivering them from the hated duke.

Feltre, It. tn. in Veneto (q.v.), 17 m. SW. of Belluno (q.v.). It is in an Alpine valley, is overlooked by an anct castle, and has a 16th-cent. church and fine frescoed houses. There is a trade in agric. produce, silk, and wine. Pop. 18,800.

Felucca, name of a particular kind of sailing boat used on the Mediterranean and in Egypt. It is a large boat built with a high bow and raking sternpost, and rigged with 2 or 3 masts, with lateen sails and a jib. It rides low on the water and moves very swiftly, being the fastest sailing boat on the Mediterranean.

emancipation lay in women's legal disabilities in the matter of acquiring their own separate property, a difficulty which was largely disposed of by the Married Women's Property Act, 1882. Legislation for giving the vote to women always passed the Commons from 1886 until 1911, being as regularly vetoed by the House of Lords. In 1918 a bill granting limited franchise was passed, and 10 years later full equality in this respect was attained. See also **WOMEN'S SUFFRAGE**.

Femunden, second biggest lake of Norway, situated 85 m. SE. of Trondheim. It is about 38 m. in length, and its greatest width is 5½ m.

Femur (thigh), see **LEG**.

Fences are made for various purposes, such as enclosing animals on pasture-ground, protecting crops from straying cattle, affording shelter from wind, and marking off boundaries. The ordinary hedge and ditch of an Eng. farm makes excellent fencing, but is expensive in the

matter of room and cost of maintenance. The hedge must be cut and trimmed regularly or it will run to top, and gaps must be stopped quickly. In many cases hedges have been grubbed out and replaced by F. made from wooden or concrete posts with stout wire (often barbed) strained between them. These are cheaper to maintain but afford less shelter or shade to stock and crops. Park F. are often constructed of posts and rails with feather-edge boards nailed on the latter, making a strong and neat enclosure. Sunk F., or 'ha-has,' are those made along the bottom of a hollow which are invisible until one reaches their edge. In parts where stone is plentiful dry-walls are often constructed, in Aberdeenshire of granite boulders, in some Eng. cos. of pieces of limestone, the top and bottom layers being sometimes fastened with mortar. On moorlands earthen banks topped with gorse make excellent F.

Fencibles, forces raised during the Amer. War of Independence and the Fr. revolutionary wars in both the U.K. and N. America. They were not liable for foreign service. In this they resembled the militia, though in organisation they were patterned on the regular army.

Fencing, the art of using a sword for attack or defence.

History.—F. has a centuries-old hist. and tradition. Swords were well estab. in the Bronze Age and all the anc. peoples, the Persians, Greeks, Romans, Egyptians for example, have left evidence of their concern with swordsmanship. There is a record of a F. match in a drawing in a tomb constructed at Luxor 2000 years B.C. In medieval times, so long a man continued to go to war encased in armour, the sword (q.v.) was heavy and clumsy. Early in the 15th cent., the discovery of gunpowder caused armour to be discarded and led to a sudden transformation of weapons to lighter forms better adapted to quick and neat fighting. Guilds of F. masters, the best known perhaps the famous Marxbruder of Frankfurt, sprang up all over Europe to study the now important art of F. The Italians are credited with being the first to recognise the superior efficiency of the point over the edge of the sword, and by the end of the 16th cent. they had developed lighter weapons and nimbler, cunning, and controlled methods which were soon universally adopted as rapier F. The rapier, a long, beautifully balanced sword excellent for attack or keeping the adversary at distance, was still too heavy to allow quick defensive movements and therefore had to be used in conjunction with a lighter sword or dagger in the left hand used primarily for defence or at close quarters. By the last half of the 16th cent. F. masters discontinued the teaching of wrestling tricks, the lunge was discovered, and swordsmanship pure and simple may be said to have originated. The Sp. school developed a scientific method early in the 17th cent. based on mathematical lines drawn on the floor within a circle, but this had little influence

on the development of swordsmanship elsewhere.

During the reign of Louis XIV, in the 17th cent., a change of fashion in dress led to a revolution in swordsmanship. Every gentleman had to carry a sword and be prepared to defend his honour 'at the drop of a hat,' but the long rapier was no longer suitable for the new elegance of knee breeches, silk stockings, and brocaded coats. Fashion decreed that the light, short, court sword should be worn. With the 'small sword' hits were made with the point only and all movements of attack and defence could be performed with one sword wielded with one hand. The dagger was no longer required for parrying, and the Fr. school of F. then evolved rapidly displaced rapier F. throughout Europe. All modern F. is based on the movements then estab.

Swordsmanship was studied in Britain for many centuries. In 1285 a statute of Edward I prohibited the estab. of F. schools or the holding of tournaments in the City of London. F. masters were regarded with disfavour as persons who encouraged duelling, brawling, and ruffianism until Henry VIII, a great lover of swordplay, founded a Corporation of Masters of Defence before 1540 to govern F. in his realms. It was because the first organisation of F. in Britain was estab. by a Tudor king that later Edward VII granted Brit. international fencers the right to wear a Tudor rose as their international badge. The sword and buckler, the long (2-handed) sword, and the backsword were the traditional Eng. weapons until the rapier was adopted in the reign of Elizabeth I. F. masters in London at that time included Vincenzo Saviolo, the first writer on the rapier here and said to have been Shakespeare's F. master; Signor Rocco, who had an academy in Warwick Lane near St Paul's; and George Silver, champion of the Corporation of Masters of Defence. From the 16th cent. prize fights were public displays of skill with swords. The fights were usually held on platforms in public gardens, and the fencer who defeated his opponents, often using a variety of weapons and often at 'sharps,' was said to 'hold the stage' to the last and collected the prize money. Towards the end of the 18th cent. James Figg, expert swordsman and the first Brit. boxing champion, introduced fisticuff fights into prize fights. This became so popular that F. was soon relegated to a prov. amusement where it degenerated to bouts with single sticks. F. was neglected in Britain during the early Victorian era, but popular interest was revived in the 1860's by its inclusion in the army physical training programme and the enthusiasm of Capt. Alfred Hutton and his friends. In 1902 the Amateur F. Association was founded to govern the sport in Britain, with Capt. Hutton as its first president, and has steadily increased in popularity both for ladies and men since that time.

F. with the small sword, even with blunted weapons, always involved danger

of injury to the eyes. Various conventions were therefore estab. to govern orthodox play. For example, hits were restricted to the breast and a fencer initiating an attack was allowed to complete his action, unless parried, before his opponent could commence his counter attack. The invention of the mask, about 1780, by the Fr. master La Boissière, allowed much freer play, including complicated movements such as remise, counter-riposte, redoublement, and so on. The traditional conventions became of increasing importance to prevent quick phrases made at close quarters with light weapons degenerating into a brawl of simultaneous movements. They have survived as the basis of the rules for foil F. Foil F., evolved directly from the light court sword, thus became a complex game, a 'conversation with the foils' but increasingly unlike the simpler swordplay in duels. Early in the 19th cent. the *épée de combat* with comprehensive target and absence of conventions, was adopted for training in schools for duelling. It is now fenced as a separate weapon. The heavy military sabre continued the tradition of backwording until the last quarter of the 19th cent., when the light lt. duelling sabre was introduced and very soon universally adopted as the recognised cut-and-thrust weapon.

Modern Fencing.—F. to-day is a very modern and athletic sport practised with 3 weapons, the foil, the *épée*, and the sabre.

The foil is the basic weapon with which the principles of swordsmanship should be learned. A light weapon with a small bell guard and square, tapering blade, the foil is a fascinating medium for the exercise of quickness of thought and movement and finesse. Hits are only valid if they are made with the point on the body. Hits which arrive on the head or limbs do not count and stop subsequent hits. Foil F. is governed by somewhat complicated conventions and rules. Besides the limited target, these rules are based on the convention that the fencer who originated an attack has the 'right of way' until his attack is parried (deflected clear of the target) when the 'right of way' passes to his opponent for the reply or riposte. If the riposte is parried the 'right of way' reverts to the original attacker for the 'counter-riposte' and so on through the sequence of F. movements which form the 'phrase.' Thus if one fencer attacks and his opponent, instead of parrying the attack, makes a simultaneous hit on the attacker only the hit made by the attacker is scored since he had the 'right of way.' An exception to the foregoing occurs when a complicated attack or one made with a bent arm is initiated, if the fencer who is attacked can seize the initiative and make a 'stop hit' well before the final movement of the attack arrives, this is given priority over the attack although no parry has been made. A simple attack (extending the sword-arm to hit the opponent's target) is easily parried, so that it is usual to precede

the real attack with false attacks, called feints, to induce the opponent to form a parry prematurely and thus leave some part of the target exposed for the final or real movement of the attack to score a hit. Foil F. is a game of skill, speed, and finesse. It is thus equally suitable for ladies as well as men, and both can derive much exercise and enjoyment from a bout together on much more even terms than at most other sports.

The *épée* is the duelling sword. Heavier than the foil, with a fluted triangular blade and a larger bell guard. Hits, with the point only, may be scored on any part of the opponent's body, head, or limbs. *Épée* bouts are fenced as near to the conditions of a duel as possible, none of the conventions of foil play apply but the object is to hit the opponent before he can hit you and, if possible, without his scoring a hit at all. The fencer who hits his opponent first in point of time scores the point. If both fencers are hit practically simultaneously a hit is scored against each because in a duel both would be wounded or dead. In order that hits can 'fix' on the wider target a *pointe d'arret* consisting of a number of small prongs is affixed to the point of the *épée*. Since *épée* bouts are judged entirely on time between the hits an electrical judging device is used in all competitions. *Épée* F. is a more open, simpler, and more athletic game than foil; tactics are of great importance and hits tend to be concentrated on the sword-arm and wrist as the nearest parts of the target.

The sabre is the light lt. duelling sword. It has a half-circular guard and a flexible flattened blade with which hits can be scored with the whole of the front edge or the last third of the back edge (cuts) as well as with the point. The valid target is the head, arms, and trunk down to the waist. Although it is a recognised duelling weapon, sabre F. in schools is governed by similar conventions and rules as the foil. Stop cuts at the arm are much used and sabre fencing is a game of much movement and skill with point and edge.

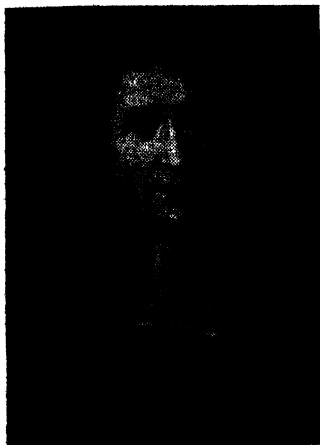
Play.—A F. bout is fought for 5 effective hits (best of 9 hits) with a time limit of 10 min. of actual F. Ladies fence for 4 effective hits and 8 min. limit. Individual competitions are usually fenced on the 'pool' system. The competitors are divided into pools of 6 or 8 in which every member fences every other member, and those with the greater number of victories are promoted to subsequent rounds until the final pool is reached. Team matches are usually between teams of 4 fencers.

The jury judges bouts at foil and sabre. It consists of a president, or referee, and 4 judges who watch each fencer in pairs and decide when a valid hit is made. The president directs the bout and alone decides on the validity of hits according to the rules after the materiality of the hits has been estab. by the judges.

The electrical judging apparatus automatically records the arrival of hits and

eliminates errors of judgment on materiality. At *épée* the apparatus also registers the priority of hits scored, and when 2 hits are made within 1/25th of a sec. it registers a double hit. Hits on the guard of the weapon or on the metallic floor do not register. There is also an electrical judging apparatus at foil which registers hits on or off the target, but the president is still required to analyse the phrase and award the hit according to the rules and conventions of foil. See also DUEL AND DUELLING. See O-L de Beaumont, *Fencing*, 1951.

Fénelon, François de Salignac de la Mothe (1651-1715), Fr. archbishop and



FRANÇOIS FÉNELON

Engraving by J. Thomson from Vivien's picture in the Louvre

writer, b. of good family at the Château de Fénelon in the prov. of Périgord. He came to Paris in 1666, and after a term at the Plessis College he entered the famous theological college of St Sulpice, then recently founded. He took holy orders there in 1675, and in 1678 became director of the Nouvelles Catholiques, a Parisian institution for female converts from Protestantism. On the revocation of the Edict of Nantes in 1686, he accompanied a mission to the Protestants of Poitou and Saintonge. In 1689 Louis XIV appointed him preceptor to his grandson, the duke of Burgundy, a position which he held for the next 6 years. The varied character of F.'s works is a proof of the originality and flexibility of his mind. They include theological and controversial works, of which the chief are the *Traité de l'existence de Dieu*, 1712, and the *Maximes des Saints*, 1697; educational and moral works: the *Traité de l'éducation des filles* (written in 1681, pub. 1689) for the daughters of the duchess of Beauvillier; and the *Fables*,

the *Dialogue des morts*, 1699—the leading idea of which is that politics must be guided by moral principles—and the *Aventures de Télémaque*, 1699, all composed for his royal pupil; political writings, of which the most important are *Plans de gouvernement*, and the *Direction pour le conscience d'un roi*, 1711; critical works: the *Dialogues sur l'éloquence*, 1718, and the *Lettre à l'Académie*, 1716. The *Aventures de Télémaque* is a pedagogic romance, imparting moral teaching together with instruction in Gk mythology and antiquities. The politics of the book are more or less Utopian and its satire was aimed at the king—whence his anger when it was pub. clandestinely. The *Plans de Gouvernement* was also directed at the king: in it F. advocates a limited monarchy in which the king may demand of his subjects only what is necessary for the good of the State, and in which authority would be shared with a strong and Christian nobility mediating between monarch and people. F.'s services to the duke of Burgundy, however, led to his advancement, and he was presented to the abbey of St Valéry in 1694, and in 1695 became archbishop of Cambrai. About this time arose the controversy concerning the Quietism of Madame Guyon, who, accused of sharing the more extreme views of Molinos, was twice imprisoned. F. defended her so far as the attacks against her were personal, and this led to a long and acrimonious controversy with Bossuet, with whom he had previously been on the best of terms. Bossuet issued his *Instruction sur les États d'Oraison*, and F. took up the cudgels on behalf of Madame Guyon, and defended some of her teachings in his *Explication des Maximes des Saints sur la Vie Intérieure*, 1697. The latter was pub. first, in violation of an understanding between the 2 prelates, apparently without the knowledge of the author, and this led to their final estrangement. After some delay, during which the controversy grew more embittered, the pope, pressed by Louis XIV, condemned the *Maximes des Saints* in 1699, and F. honourably accepted the decision in accordance with his own declared views on papal authority. Pope Innocent summed up the matter in the words, 'F. erred by loving God too much, and Bossuet by loving his neighbour too little.' Ordered by the king to retire to Cambrai, F. spent his last years in doing good pastoral work within the confines of his diocese. He was buried in Cambrai Cathedral. The only controversy of his later years had reference to the Jansenists, whom he vigorously opposed. It is generally conceded that F. was in many ways a model archbishop, but for the rest his character has been the subject of much speculation and controversy. He was a born teacher, who combined the address of a *grand seigneur* with all the refinements of an accomplished ecclesiastic; gentle but also hard and inflexible when the case required it. He carried on a voluminous correspondence, and his many interests included politics, literature, and philosophy.

There are eds. of his works by J. B. Bossuet, 1821-4, Lebel and Leclère, 1820-30, Gosselin, 1851, and *Correspondances*, 1827. See J. B. Bossuet, *Histoire de Fénelon*, 1850; E. De Broglie, *Fénelon à Cambrai*, 1884; M. Maasson, *Fénelon and Madame Guyon*, 1907; H. Bremond, *Apologie pour Fénelon*, 1910; A. Déplaigne, *La Pensée de Fénelon*, 1930; E. Carcassonne, *Étal présent des travaux sur Fénelon*, 1939.

Feng Meng-lung, see CHINESE LITERATURE.

Fenham, see NEWCASTLE UPON TYNE.

Fénho, largest riv. in Shanai, China. It flows in a SSW. direction, and is a trib. of the Yellow R. The lower course of the riv. is the only part navigable, and this only part of the year, as in winter it is frozen over.

Fenians, or **Fenian Society**, name of a 19th-cent. Irish-Amer. movement for the overthrow of Brit. rule in Ireland and the estab. of a rep. The name was derived from the anct *fann* or *féinne* (see FIANS), a legendary band of warriors in the heroic age of Ireland. The modern movement originated in America, where the Irish pop. had been greatly increased by emigrants after the famine of 1846-7, and it was there that the first Fenian organisation was founded by John O'Mahony in 1858. The F. were particularly active in the U. States, but the movement soon had many ramifications, and agents were sent to Ireland and to the centres of Irish pop. in England. The result in Ireland was the 'Phoenix Conspiracy,' which was put down with little difficulty by the gov. James Stephens, one of the 'rebels of 1848,' and other prominent leaders were arrested, and *The Irish People*, ed. by Jeremiah O'Donovan (O'Donovan Rossa), a prominent member of the Phoenix National and Literary Society, was suppressed. Many prisoners were convicted of treason and sentenced to penal servitude. Stephens escaped from prison, and renewed the agitation in America. A raid into Canada occurred in 1866, but it proved a complete failure. The collapse of the movement dates from 1867, when an attempt at insurrection in Ireland proved utterly abortive. The Catholic priesthood never countenanced the movement, and the peasantry were lukewarm. Sev. outrages took place in England. A raid was made on the castle and military stores at Chester, but the raiders were betrayed. In the same year (1867) a police van, containing suspected F., was attacked at Manchester, and an attempt was made to blow up the wall of Clerkenwell Prison in London. The energetic measures of the gov. and the subsequent Irish reforms, inaugurated by Gladstone, restored tranquillity in Ireland. Fenianism, however, continued to smoulder, particularly in the U.S.A., where another raid on Canada was frustrated by the U.S.A. Gov. The Clan-na-Gael and United Irish Brotherhood were then the 2 great F. Ss. and at the instigation of Michael Davitt (q.v.) they made the new departure which resulted in the Land

League (q.v.) and the National League. The Phoenix Park assassination (1882) was connected with the extreme party (see CAVENDISH, LORD F. C.). See SINN FEIN.

See J. Rutherford, *Secret History of the Fenian Conspiracy*, 1877; Justin McCarthy, *History of our own Times*, 1880; J. O'Leary, *Recollections of Fenians and Fenianism*, 1896; and W. O'Connor Morris, *Ireland from 1798 to 1898*, 1898.

See also HOME RULE; IRELAND, REPUBLIC OF.

Fenn, George Manville (1831-1909), novelist, b. Pimlico. Educ. at Battersea Training College, he was for a time a schoolmaster in Lincs. He wrote more than 170 books, the most successful being his adventure stories for boys; among the best known of these are *In Honour's Cause*, 1896, *Fire Bay'nets*, 1899, *Dick o' the Fens*, 1905, and *Shoulder Arms!*, 1905.

Fennec, Moorish name for *Vulpes zerda*, a species of fox native to N. Africa and ranging over the whole of the Sahara Desert. It has a coat of a pale fawn colour, which harmonises with its surroundings, black markings on the tip of the tail, and white round the eyes and on the forehead. The ears are huge compared with the size of the head, and give the animal a grotesque appearance. The body and head measure 15½ in. in length, and the tail 6½ in. The F. is a burrowing animal, and lines its habitation with feathers, hair, and other soft materials.

Fennel, usually perennial herbs of the Umbelliferae. *Foeniculum vulgare* grows in most temperate countries; its leaves are used for fish sauces, garnishings, and salads; and in Italy for soups or eating raw; seeds are used for flavouring, and for an infusion as a carminative; and an oil is distilled from them. *F. v. variety dulce*, the Florence F., or Fennocchio, is a cultivated, dwarfed form; and *F. v. variety piperitum* is the Carosella of S. Italy; both grown for salads and cooking, with a flavour like celery, but sweeter and more aromatic.

Fennell, John Greville (1807-85), artist and angler, b. at sea between England and Ireland. He studied art, then took to literature, joined the staff of the *Field* and wrote on fishing subjects for it and the *Fishing Gazette*. In 1870 he pub. *The Book of the Roach*, and he also contributed a paper on 'Curiosities of Angling Literature' to C. Pennell's *Fishing Gossip*. F. was a friend of Dickens and Thackeray.

Fenny Stratford, former mkt tn of Buckinghamshire, England, now incorporated in Bletchley (q.v.). St Martin's Day, 11 Nov., is celebrated by a service in the church of St Martin, built in 1730 on the site of an older one, and the firing of small cannon called the 'Fenny Poppers.'

Fens, low-lying dist. in the E. of England, situated W. and S. of the Wash, covering parts of the cos. of Lincs, Hunts, Cambs, Suffolk, and Norfolk. The region is about 70 m. from N. to S. and roughly

35 m. from E. to W.; it represents a bay of the North Sea (now silted up) of which the Wash (q.v.) is the last remnant. The prin. rivs. are the Great Ouse, Witham, Welland, and Nene, and many small watercourses intersect the area. Before the present system of drainage was developed, the whole dist. was waterlogged and consisted of marshy swamps, wide pools, and lagoons. The Romans made the first attempt to drain the F.; they dug the Caer or Car Dykes from Lincoln to Ramsey and constructed earthen embankments along the Welland and the seashore, some m. of which can still be seen. An unsuccessful attempt was made in the reign of Wm the Conqueror to drain Deeping Fen. After this the dist. was abandoned, although the forest portions were later preserved for the Plantagenet kings to hunt over. The isolated areas of higher ground above the surrounding levels were occupied by cells and monastic estabs, as early as the 7th cent. The religious houses at Peterborough, Ely, Crowland, Ramsey, Thorney, and elsewhere disseminated a knowledge of cultivation and a certain amount of drainage was done in their immediate neighbourhood up to the dissolution of the monasteries. In the reign of Charles I another attempt was made to drain Deeping and Holland F. on Dutch methods by Cornelius Vermuyden (q.v.), and the initial efforts were made on the great scheme for the Nene and Ouse F., known as the Bedford Level (q.v.). The drainage of the other F. continued through the 18th and 19th cents. Frequent flooding has been caused in the F. by the coincidence of high spring tides and rivs. swollen with water drained off the land. The system of sluices (closed at high tide) keeps the sea water from entering the rivs. but likewise prevents the riv. water from escaping to the sea. Consequent piling up of fresh water may strain the banks and flooding follows.

The Great Ouse Riv. Board commenced a large-scale flood protection scheme in 1954 to prevent future flooding of the F. This scheme provides for the construction of a new intercepting channel round the edge of the F. from Barton Mills in Suffolk to Denver in Norfolk, for the widening and deepening of the existing riv. from Denver to the mouth of the Cam, and for a relief channel to carry the flood water direct to an outfall at King's Lynn. The scheme is expected to cost over £5 million.

The only part of the original wild, undrained Fenland is Wicken Fen, SE. of Ely, now vested in the National Trust as a unique natural preserve of wild plant and animal life. The soil of the F. is extraordinarily fertile and indeed forms some of the most productive agric. land in England; the area is noted for its bulb fields (especially around Spalding, q.v.) and for the growing of vegetables. There was opposition to the various drainage schemes, and the draining of enclosures always brought trouble with the Fenmen who were tenacious of their assets. In

earlier times life in the F. was primitive, being spent largely in fowling and fishing; both wild fowl and fish are still found in abundance in the rivs. and marshes. Woad is still grown in a few of the F. pars., a feature of the landscape are the little windmills, now mostly disused, dotted about the lonely flats. The region is associated with Hoadices, Hereward the Wake, and Cromwell, who was a native of the F. See H. C. Darby, *Draining The Fens*, 1940, *Medieval Fenland*, 1940, and *Domesday Geography of Eastern England*, 1952; A. Bloom, *The Fens*, 1953; and L. E. Harris, *Vermuyden and the Fens*, 1953.

Fenton, Elijah (1683-1730), poet, b. Shelton, near Newcastle under Lyme, Staffordshire. Educ. at Cambridge, he became private secretary to the earl of Orrery, with whom he went to Flanders, but later he came back to England and was appointed headmaster of the grammar school at Sevenoaks. He resigned in 1710, and became tutor to Lord Broghill, the son of his former employer. He worked with Pope at the trans. of the *Odyssey*, the 1st, 4th, 19th, and 20th books being trans. by him. He also ed. Milton and Waller, 1725 and 1729, and wrote a tragedy entitled *Mariamne*, 1723, and many poems. See W. W. Lloyd, *Elijah Fenton, his Poetry and Friends*, 1894.

Fenton, Sir Geoffrey (c. 1539-1608), Eng. translator, brother of Edward F., the navigator. While in Paris in 1567 he wrote *Certain Tragical Discourses written out of French and Latin*; consisting mainly of stories from Bandello, it has been styled 'a capital miscellany.' He also wrote *Monophylon, a Philosophical Discourse and Division of Love*, 1572, but his monumental work, pub. in 1579 and dedicated to Queen Elizabeth I, was his *History of the Wars of Italy*, trans. from Fr. versions of Guicciardini's *Storia d'Italia*. From 1580 till his death he was secretary to the lord deputy of Ireland.

Fenton, tn of Staffordshire, England, prior to 1910 an urb. dist., and since that date federated with the other pottery tns into the city and co. bor. of Stoke-on-Trent. Most of the people are employed in the manuf. of earthenware and china, other industries being coal-mining and engineering. Pop. 22,314 (1954).

Fenwick, Ethel Gordon (1857-1947), Brit. nurse, daughter of David Davidson Manson, of Spynie House, Morayshire. Educ. privately at Middlethorp Hall, York. She became a nurse in the Children's Hospital, Nottingham, in 1878, and was matron of St Bartholomew's, 1881-7. She married Dr Bedford F., gynaecologist, in 1887. From 1893, hon. editor of *Journal of Nursing*. Founder and first member of Brit. Nurses' Association. In her time, as the result of representations made by herself and the Royal College of Nursing, Parliament passed the Nurses' Registration Act, 1919. Founder and hon. president of the International Council of Nurses, 1900.

Fenwick, Sir John (1645-97), conspirator. He entered the army and became

a major-gen. in 1688. He was a strong supporter of James II. He was arrested in 1696 for a plot to assassinate William III, and was beheaded.

Feodor, see **FÉDOR**.

Feodosiya (anc. Theodosia), then until 1804 (Kaffa), Black Sea port in S.E. Crimea. It has food industries. There are the remains of medieval walls, and an archaeological museum dating from 1811. Founded by the Greeks in the 6th cent. BC, it was a flourishing centre of the Genoese colonies on the Black Sea, 1260-1475, then Turkish. It became Russian in 1774. It was the scene of much fighting in 1941-2. Pop. (1956) 43,000, mostly Russians.

Feoffment, in feudal times, the usual way of conveying a freehold estate in England, and for a long period the only way. This method of conveying required to be accompanied by *livery of seisin*, either *in deed* or *in law*. In the case of *livery in deed* the feoffor handed a twig or clod of turf to the feoffee on the land to be conveyed; in *livery in law* the feoffor formally gave possession to the feoffee in sight of the land. A F. was usually evidenced by charter or deed, but writing was not necessary before the Statute of Frauds. The Real Property Act of 1845 rendered F. superfluous.

Ferae Naturae, term given in Rom. law to wild animals and birds, including game, such as rabbits and pheasants. In Eng. law, as was the case in Rom., they become the property of the first person who takes possession of them, subject, of course, to the game laws. A person keeping wild animals is responsible for any damage they may do.

Ferber, Edna (1887-), Amer. novelist, b. Kalamazoo, Michigan. Though she lived latterly in New York, her outlook is mid-W. After writing *Damn O'Hara*, 1911, and *The Girls*, 1921, she became a best-seller with *So Big*, 1925, which won the Pulitzer Prize. *Show Boat*, 1926, which was made into a musical play and a film, was followed by *Cimarron*, 1929, *Come and Get It*, 1935, *Sartogin Trunk*, 1941, and *Giant*, 1952. She also collaborated with George S. Kaufman in a number of plays, including *Dinner at Eight*, 1932, *Stage Door*, 1938, *The Land is Bright*, 1941. *A Peculiar Treasure*, 1939, is autobiographical.

Ferdausi, or **Ferdusi**, see **FIRDAVSI**.

Ferdinand I (c. 1000-65), king of Castile and Leon, second son of Sancho the Great of Navarre. He acquired possession of Castile in 1028, and was recognised as its first king in 1037. In the same year he claimed Leon by right of his wife, who was a sister of Bermudo III of Leon, and enforced his claim with the sword. He drove back the Moors, extended his frontiers from the Duero to the Mondego, and took the title of emperor of Spain in 1056. He left a reputation for piety.

Ferdinand II (1136-88), king of Leon, younger son of Alfonso of Castile and Leon, succeeded in 1157. He was constantly at war with the Moors, Castile, and Portugal. His repudiation of his

wife led to war with his father-in-law, Alfonso I of Portugal, whom he defeated and captured at Badajoz. The military order of Alcantara was founded by the pope during his reign.

Ferdinand III, Saint (c. 1200-52), king of Castile and Leon, son of Alfonso IX of Leon and Berengaria of Castile; became king of Castile in 1217, and succeeded his father as king of Leon in 1230. Thenceforward the kingdoms were never separated. F. fought with success against the Moors, capturing Ubeda (1234), Cordova (1236), Jaen (1246), and Seville (1248). He subdued Granada and made Seville his cap. He was responsible for the collection and codification of the *Las* and Gothic laws known as the *Forum Judicum*. He was canonised in 1671 by Clement X.

Ferdinand I (c. 1373-1416), king of Aragon, surnamed 'The Just,' was the son of John I of Castile, but was elected king of Aragon in 1410. He proved a strong ruler, and carried on the war against the Moors. Though at first a supporter of the anti-pope, Benedict XIII, an Aragonese, he afterwards agreed to his deposition in order to end the Great Schism.

Ferdinand V (1452-1516), king of Spain (Ferdinand II of Aragon, and V of Castile), son of John II of Aragon and Sicily, b. Sos in Aragon. At 16 he married (1469) Isabella of Castile (q.v.), and on the death of her brother, Henry IV, in 1474, F. and Isabella were proclaimed joint sovereigns, though Isabella did not allow her husband much share in the gov. F. succeeded to Aragon in 1479 on the death of his father, and the union of these 2 kingdoms marked the beginnings of Sp. ascendancy in Europe. The power of the nobles was broken, and vigorous reforms were carried out, the king and queen being ably seconded in all their undertakings by Cardinal Ximenes. In 1492, Granada, the last kingdom of the Moors in Spain, was finally conquered after 10 years of strenuous conflict. In that year also Columbus, supported by the queen, set out on his great voyage of discovery, which made F. and Isabella sovereigns of a new world. A blacker episode of the period was the spoliation and expulsion of the Jews in 1490-2. The Moors, too, were treacherously treated, a promise of toleration by the 'Catholic kings' being violated. The Court of Inquisition had already been instituted at Seville (1480). In 1500 F. took part in the conquest of Naples, and, outwitting his allies, made himself master of it in 1503. By arranging politic marriages for his children, he gained for himself allies on all sides of France, and in 1512 he seized a favourable opportunity to add the S. part of the coveted kingdom of Navarre to his dominions, which thus stretched from the Pyrenees to Gibraltar. Isabella had d. in 1504 (though F. maintained his power in Castile until his death, acting as regent there, except for a brief interval) and F. married Germaine de Foix. He d. at Madrigalejo, and was succeeded by his grandson, the emperor Charles V, who was

already master of Burgundy, Flanders, Holland, and part of Italy. F. was a shrewd and clever diplomatist, though deceitful and despotic. The enthusiasm which governed Spain's religious policy during this period, and the vision which encouraged the foundation of a Sp. empire in America, were supplied by his wife, Isabella.

Ferdinand VI (1713-59), king of Spain, *b.* Madrid, the second son of Philip V. whom he succeeded in 1746. He helped to end the war of the Austrian Succession, and pursued a steady policy of neutrality in the Seven Years War, in spite of overtures from England and France. He did much to revive literature and the arts in Spain, and also attempted internal reforms. The death of his wife in 1758 resulted in his falling into a deep melancholia, from which he never recovered.

Ferdinand VII (1784-1833), king of Spain, eldest son of Charles IV. In 1808 Charles abdicated and F. became king. F. was almost immediately forced by Napoleon to abdicate in turn, and was enticed across the frontier and kept prisoner at Valençay. After the Peninsular war he was reinstated (1814), and promised to maintain the democratic constitution adopted by the gov. of National Defence at Cadiz in 1812. He twice broke a promise of this character, but by receiving Fr. support was able to maintain despotic gov. He was succeeded by his daughter, Isabella II, for whose sake he had repealed the Salic law, an act which subsequently led to the Carlist wars.

Ferdinand I, Holy Rom. emperor (1503-1564), *b.* Alcalá, Spain, younger son of Philip I and brother of Charles V. He married a sister of Louis, the king of Bohemia and Hungary, and he claimed the 2 kingdoms on the death of Louis, in battle, in 1526. His claim to Hungary was contested by John Zapolya, supported by the Turks, but, after buying off the Turks, F. gained the day. He succeeded Charles V as emperor in 1556. F. tried to conciliate Rom. Catholics and Protestants, and his reign was marked by generally wise and enlightened gov.

Ferdinand II (1578-1637), Holy Rom. emperor, *b.* Graz, a nephew of Maximilian II. His early training and his education by the Jesuits imbued him with a deep hatred against Protestantism, and he began early to try to put down Protestantism by force, first in his own duchy of Styria, and then in Bohemia (of which he was crowned king, 1617). When the Bohemians saw that F. intended to deprive them of the privileges they had gained under Rudolf, they declared that he had forfeited the throne and elected Frederick the Elector Palatine in his stead. This led to the outbreak of the Thirty Years War (q.v.) which had already begun when F. succeeded Matthias as emperor in 1619. F., supported by the Catholic League, was at first successful and gained a firm hold of the Bohemian throne. His gen., Tilly, defeated Christian IV of Denmark and the Protestant confederacy in 1626, but 2 years later,

after Wallenstein was checked before Stralsund, the Catholic cause began to decline. The success of the Protestant champion, Gustavus Adolphus, and the assassination of Wallenstein, at which F. connived, combined with other causes to bring his fortunes to a very low ebb at the time of his death in 1637.

Ferdinand III (1608-57), Holy Rom. emperor, *b.* Graz, the son of Ferdinand II. He took part in the Thirty Years War before his accession in 1637, and, though more inclined towards peace than his father, was compelled to continue the war for the first 11 years of his reign. A series of disasters in the summer of 1648 forced him to make peace, and the peace of Westphalia was concluded in Oct. of that year. In the Diet of 1653-4, the last over which an emperor presided in person, important changes were made in the administration of justice.

Ferdinand I (1751-1825), king of the Two Sicilies, *b.* Naples, the son of Charles III of Spain. He succeeded his father on the Neapolitan throne in 1759, ruling over Naples, 1759-1806 and 1816-1825, and over Sicily, 1759-1825. He consolidated his dominions as the Two Sicilies in 1816. From 1806 to 1815 Naples was under the domination of Napoleon. F. was a weak ruler, and the gov. was really controlled by his wife, Marie Caroline of Austria. His gov. was tyrannical and capricious, and although F. frequently promised reforms, at the request of the great powers, he always broke his word.

Ferdinand II, king of the Two Sicilies (1810-59), grandson of the preceding, *b.* Palermo. His reign opened in 1830 with promises of constitutional reforms, but they were unfulfilled, and his despotic and corrupt rule culminated in insurrection in Sicily (1848). His ferocious bombardment of the chief cities in 1849, which crushed the rising, earned for him the nickname of 'Bomba.' His vicious treatment of political suspects was the subject of 2 notable letters of Gladstone in 1851.

Ferdinand III (1769-1824), grand duke of Tuscany (1790-9 and 1814-24), younger son of the Emperor Leopold II, *b.* and *d.* Florence. He succeeded his father as grand duke, and continued his father's reforming policy. He was the first sovereign to acknowledge the Fr. rep., but nevertheless became involved in a quarrel with France, and Florence was occupied by the Fr. in Mar. 1799. He was restored later in the year, but in 1801, by the treaty of Lunéville, Tuscany was formed into the kingdom of Etruria. F. was finally restored in 1814 by the congress of Vienna, when his liberal rule contrasted with that of the majority of other restored monarchs. In the meantime he had been successively elector of Salzburg and grand duke of Würzburg.

Ferdinand I (1861-1948), 1st tsar of Bulgaria, *b.* Vienna, the youngest son of Prince Augustus of Saxe-Coburg and Princess Clementine of Bourbon-Orléans. He married: (1) 1893, Princess Marie Louise, daughter of the duke of Parma,

who d. in 1899; and (2) 1908, Princess Eleonore of Renss, who d. in 1916. On the deposition of Prince Alexander of Bulgaria, F. accepted the offer of the succession. He was elected by the Bulgarian Parliament, 1887, but his sovereignty was not recognised by Turkey until 1896. A nimble cunning distinguished his reign, and with much astuteness he played the politicians and the military against each other. By 1896 his position, both nationally and internationally, had been rendered secure. In 1908 he declared the complete independence of Bulgaria and assumed the title of tsar, soon securing recognition from all the major Powers. F. set himself very successfully to the task of building up and consolidating his kingdom, and the fruits were seen on the outbreak of the Balkan war in 1912; the result of which was to enlarge the ter. of Bulgaria enormously. But his former allies, Greece and Serbia, dissatisfied with this result, turned against him, and, with the assistance of Rumania, in a war that began at the end of June 1913, greatly reduced Bulgaria's share of the conquests. This left F. bitter and revengeful against the other Balkan states. He remained neutral in the First World War until Oct. 1915, when he entered it on the side of the Central Powers. He was victorious in Macedonia, Thrace, and Rumania; but his army was defeated by Allied troops at Dobropole, Sept. 1918, and an armistice was signed. On 4 Oct. he abdicated in favour of his son Boris (q.v.), and retired to Coburg, where he d. 30 years later.

Ferdinand of Rumania (1865-1927), b. Sigmaringen, 2nd son of Prince Leopold of Hohenzollern-Sigmaringen, who was brother to Charles, 1st king of Rumania. Charles had no son and F. was adopted his heir in Mar. 1889. On 10 Jan. 1893 he married Marie, eldest daughter of the duke of Edinburgh. Troops of the central powers overran Rumania on the outbreak of war in 1914; F. and his family retired to Jassy. He succeeded to the throne on 11 Oct. 1914, and immediately sided with the Liberal gov. against the Central Powers. He was obliged to sign an armistice, 7 Dec. 1917, but refused to sign the treaty of Bucharest, 7 May 1918, and denied its validity. In Nov. F. proclaimed expulsion of enemy troops; he re-entered Bucharest, 1 Dec. In Aug. 1919 he sent into Hungary an expedition which led to the downfall of Bela Kun. F. and Marie were crowned king and queen of Greater Rumania, 15 Oct. 1922, at Alba Iulia. Under F. universal suffrage was introduced and large estates were expropriated (F. was himself the first to hand over his own estate to the peasants). In 1925 he caused his son Carol (q.v.) to be disinherited in favour of Carol's son Michael; and his last political act was to instal Carol's opponents in power. F. d. at Sinaia, 20 July, 1927.

Ferentino, It. tn. in Lazio (q.v.), 6 m. NW. of Frosinone (q.v.). It has a cathedral, and has remains of vast, ant. limestone walls. The tn. was much

damaged in the Second World War. There is a trade in agric. produce, wine, and oil. Pop. (tn) 7900; (com.) 16,000.

Fergana, or Ferghanah: 1. The name of an area which at the coming of the Russians in the middle of the 19th cent. formed the independent Khanate of Kokand. It was later annexed by the Russian Gov. and became part of the prov. of Turkestan. In the realignment of national ters. carried out by the Soviet Gov., F., or the F. valley as it is usually called, was divided among the reps. of Uzbekistan, Tajikistan, and Kirgizia. Nearly the whole of F. belongs to the fertile basin of the Syr-Darya, the outlying parts being mountainous. To the E. are the Tien Shan ranges; to the N. are the Ala-tau Mts, while the Trans-Ala-tau chain encloses the plain on the S. with the Tien Shan. The richest and most densely populated part of this whole region of Middle Asia is the F. valley. Sheltered from cold winds by some of the highest mts in the world, which practically encircle it, it consists of a flat valley floor covered by a thick network of irrigation channels, with poplars and willows growing along their banks. Cotton and sugar beet are the chief crops. The lower hillsides of the valley are treeless, with occasional patches of pistachio, almond trees, iron wood, and maple. The new F. canal is 170 m. long and provides water for over 12,000 ac. of grain as well as for potatoes, cucumbers, and tomatoes in the Uzbek, Tajik, and Kirgiz Reps. Minerals such as iron, coal, etc., are plentiful, and rice, maize, grapes, and melons are produced. But by far the most important crop is cotton, the F. valley being the main cotton-producing area in the U.S.S.R.

2. An oblast (prov.) of the Uzbek S.S.R. of the Soviet Union, consisting of the SW. portion of the F. valley. Pop. 720,000.

3. Tn and cap. of F. oblast, formerly called Novyy Martelan and Skobelev. It is an important cotton and silk centre and has a large power plant. Pop. 80,000.

Ferguson, Adam (1723-1816), philosopher, b. Logierait, Perthshire, was for a time chaplain to the Black Watch, and is said to have fought at Fontenoy. He succeeded Hume as keeper of the Advocates' Library, Edinburgh, in 1757; became prof. of natural philosophy in 1759, and of moral philosophy in 1764, at Edinburgh Univ., and afterwards travelled extensively. It was at his house that Scott, when a boy, had his memorable meeting with Burns. Chief works: *Essay on Civil Society*, 1767, *Institutes of Moral Philosophy*, 1769, and *History of the Progress and Termination of the Roman Republic*, 1783.

Ferguson, Robert (c. 1637-1714), pamphleteer and conspirator, known as 'The Plotter,' b. in Aberdeenshire. He spent most of his life in political intrigues. He became vicar of Godmersham, Kent, but was ousted in 1662 by the Act of Uniformity. He took a leading part in the conspiracies against Charles II and James II, accompanied Monmouth's futile

invasion, and supported the cause of William of Orange. Chagrined at the scant recognition he received from Wm, he finally transferred his services to the Jacobites.

Ferguson, Sir Samuel (1810-86), poet and antiquary, *b.* Belfast, was educ. at Trinity College, Dublin, and was called to the Bar in 1838. He gave up his legal practice in 1867, when he was appointed deputy-keeper of the Irish Records. He was conspicuously successful in that capacity, and was knighted for his services in 1878. His antiquarian works include the *Ogham Inscriptions in Ireland, Wales and Scotland*, pub. in 1887, and various papers contained in the *Transactions of the Royal Irish Academy*, 1834-84, of which he was a notable president. Much of his leisure was devoted to poetry, and the charm of his lyrics and ballads anticipates the modern Celtic Revival. *The Forging of the Anchor* is generally regarded as his masterpiece. His other pubs. in verse include *Lays of the Western Gael*, 1865, and *Comgal*, an epic poem, 1872.

Fergusson, James (1808-86), 'the historian of architecture,' *b.* Ayr. His studies in Bengal resulted in the pub. of *Rock Temples of India*, 1843, *Ancient Buddhist Architecture of India*, 1848, and *Fire and Serpent Worship*, 1869. He also studied the archaeological remains of Palestine and surrounding countries. His monumental work is *A History of Architecture in all Countries from the Earliest Times to the Present Day*, 1865-7.

Fergusson, Robert (1750-74), poet, *b.* Edinburgh, his father being a clerk in the Brit. Linen Company. He obtained a good education at Dundee Grammar School and St Andrews Univ., but, declining to enter the Church or to study medicine, he spent his few brief years as a copying-clerk in the commissary clerk's office, Edinburgh. He contributed humorous descriptive poems to *Ruddiman's Weekly Magazine*, and the reputation of these drew him into a convivial society in which he ruined his health. A meeting with John Brown of Haddington influenced him for the better, but an injury to his head turned religious melancholy into insanity, and he *d.* in the city asylum. Robert Burns was greatly influenced by his poems, which were first pub. in 1773. Realist and humorist, in 'The Daft Days,' 'Hallow Fair,' and 'Leith Races,' *F.* depicts with vividness and gusto the rough hearty life of his native city, so that he has been termed 'the laureate of Auld Reekie.' See life by A. B. Grosart, 1898.

Fergusson, Sir William (1808-77), surgeon, *b.* Prestonpans, Scotland. Prof. of surgery at King's College, London, 1840-70. He was elected president of the Royal College of Surgeons in 1870, and was surgeon to Queen Victoria. *A System of Practical Surgery*, 1842, was his most important work. He was elected a Fellow of the Royal Society in 1843; created baronet 1866. See H. Smith, *Biographical Sketch*, 1894.

Feriae, holy days, or sacred festivals, in

anct Rome. They were the *dies nefasti*, in contradistinction to the *dies fasti*, and correspond in some respects to the modern Sunday. Political and legal business was suspended, and slaves were given a respite from labour. There were 45 *F.* during the year, in addition to such festivals as the *feriae Latinae*, the dates of which were fixed annually, and special festivals at times of danger or victory. In addition to the *feriae publicae*, or public festivals, there were *feriae privatae*, observed by many single families in celebration of some particular event in their hist.

Feridoun, see FARIDUN.

Feringhi, or **Feringhee**, name for Europeans, common in the E., and dating from the Crusades, the word being a corruption of Frank. In India it is specially applied to the native-born Portuguese of Bengal. It has come to have a contemptuous implication, and was so used in the Indian Mutiny.

Ferishta, Mohammed Kasim (c. 1550-1612), Persian historian, *b.* Astrabad. As a young man he went to India and became captain in the bodyguard of the prince of Ahmednagar. In 1589 he removed to Bijapur, and was commissioned by Ibrahim Adil Shah (1585-1628) to write a hist. of the Muslim dynasties of India. He is one of the most trustworthy of Oriental historians, and his work still maintains a high place as an authority. It was trans. by J. Briggs under the title of *The History of the Rise of the Mohammedan Power in India*, 1829.

Ferlach, Austrian tn in the prov. of Carinthia, 7 m. S. of Klagenfurt. It is famous for its manuf. of sporting rifles, an industry started in 1553 by Belgian settlers. The craftsmen are organised in a kind of guild. Pop. 5200.

Fermanagh, co. of N. Ireland. The surface is hilly, the highest points being Culcagh (2188 ft) and Belmore, and the limestone hills of W. *F.* contain many remarkable cave systems, notably the Marble Arch and Noon's Hole. Lough Erne, with the R. Erne joining its lower and upper parts, bisects the co. throughout its entire length. The salmon fisheries of the Erne are important, and pike and trout are also caught in most of the loughs. There is an abundance of sandstone and limestone, and iron also occurs. Manufs. are few, the chief being pottery, tweeds, blankets, rugs, and cotton thread, for the people are chiefly engaged in agriculture. The only tn of importance is Enniskillen. *F.* is in the 2 dioceses of Clogher and Kilmore. By the Gov. of Ireland Act, 1920, *F.* returns 3 members to the N. Ireland Parliament. For administrative purposes *F.* is divided into the urb. dist. of Enniskillen and the rural dists. of Enniskillen, Irvinestown, and Lisnaskea; Belleek and Clones were merged in the foregoing rural dists. in 1921. Area 715 sq. m.; pop. 53,000.

Fermat, Pierre de (1601-65), fr. mathematician, *b.* Beaumont-de-Lomagne, near Montauban. He made many discoveries in the properties of numbers, probabilities,

and geometry, and is said to have been the first to hit upon the principle of the differential calculus. He also collaborated with his friend Pascal in some of his mathematical researches. F.'s principle postulates that a light-ray traversing different media follows the path of least deviation. His writings, pub. after his death by his nephew, include: *Arithmetic of Diophantus*; *Method for the Quadrature of Parabolas*; treatises, *Maxima and Minima, on Tangents, and on Centres of Gravity*; *Geometric Loci, or Spherical Tangencies, and Rectification of Curves*. His collected works were pub. at Toulouse in 2 vols., 1670-9, and were re-ed. by Tannery and Henry, 1891-4. See A. Gentry, *L'Influence de Fermat sur son siècle*, 1784, and P. Bachmann, *Das Fermatsche Problem in seiner bisherigen Entwicklung*, 1919.

Fermentation, process by which a change is effected in the chemical constitution of many organic substances. It is well known that liquids formed from the juice of fruits gradually alter in character with the evolution of bubbles of gas, that milk cannot be preserved from becoming sour without special treatment, and that all dead organic matter putrefies or changes its chemical composition in course of time. These changes are brought about by the activity of various minute organisms, which contain substances known as enzymes (q.v.). The enzymes are the actual agents of the F. processes. In many cases they can be extracted from the organisms and work just as effectively, showing that the presence of a living cell or cells is not essential to F. Enzymes induce chemical changes in somewhat the same manner as catalysts hasten certain inorganic reactions. F. normally occurring in the presence of living organisms takes place when the temp. is suitable for their multiplication, where there is abundance of moisture and suitable food, and where there are no substances with a poisonous action on the organism. Perhaps the most important of fermentative processes is that by which the alcoholic liquors of commerce are prepared. (See ALCOHOL; BEER; BREWING; WHISKY; WINE.) This process is due to a member of the fungus group, yeast, which consists of rounded cells about 0.01 mm. in diameter, usually grouped in chain-like clusters. When introduced into solutions of sugars containing other organic substances which the yeast uses as food, the cells bud and multiply. The temp. must be maintained between 5° and 30° otherwise the cells are unable to multiply, and may eventually be killed. The yeast cells contain enzymes which produce characteristic chemical changes, and the action of each enzyme appears to be restricted to a few media. The chief enzymes present in yeast are *zymase*, which causes the breaking-up of glucose (grape-sugar) and fructose (fruit-sugar); *invertase*, which converts cane-sugar into invert-sugar, a mixture of glucose and fructose; and *maltase*, which converts maltose into glucose. In the manuf. of beer (q.v.), the

action is begun by another enzyme, *diastase*, which is formed in the grains of barley during malting. The diastase converts the starch in the malt into dextrin and maltose. After the introduction of yeast into the wort, the maltose is converted into glucose by the enzyme maltase, and the enzyme zymase proceeds to set up alcoholic F. The effect of this F. is to break up the sugar into alcohol and carbon dioxide, thus: $C_6H_{12}O_6$ (glucose) = $2C_2H_5O$ (alcohol) + $2CO_2$. It is uncertain whether the chemical action accomplished is due *entirely* to the enzymes. The living cells produce a far greater effect than do the enzyme-containing juices obtained by breaking up and pressing the cells, indicating that a 'vital action' operates during F. But possibly harmful enzymes are isolated inside the cells.

Acetic fermentation is brought about by a living ferment, *Mycoderma aceti*, which finds its way into weak alcoholic solutions from the air, and, living upon the nitrogenous matter in the solution, causes the alcohol to combine with the oxygen of the air, thus: $C_2H_5O + O_2 = C_2H_3O_2$ (acetic acid) + H_2O . The formation of acetic acid in this way accounts for the souring of beer and light wines when exposed to the air, and is the basis of the manuf. of vinegar.

Lactic fermentation is caused by a living organism, the lactic ferment, which has the power of causing milk-sugar or lactose to combine with water to form lactic acid, thus: $C_{12}H_{22}O_{11}$ (lactose) + $H_2O = 4C_3H_5O_3$ (lactic acid). This acid accounts for the sour taste of milk which has been exposed to the air.

Butyric fermentation is caused by a living organism, the butyric ferment, which is present in decomposing cheese. It often accompanies the lactic ferment, in which case the lactic acid is broken up with the production of the foul-smelling butyric acid, thus: $2C_3H_5O_3$ (lactic acid) = $C_4H_7O_2$ (butyric acid) + $2CO_2$ + $2H_2$.

Glycerin by fermentation. If normal sodium sulphite is added to a sugar solution which is then fermented, the main products are acetaldehyde (q.v.) and glycerin (q.v.), with little alcohol. Glycerin was manufactured in Germany during the First World War on this principle.

Fermentation in digestion.—The higher animals are also capable of producing enzymes. Thus the cells of the salivary glands produce *ptyalin*, which converts starch into sugar, and the gastric tubules produce *pepsin*, which transforms proteins into peptones. See DIGESTION.

Fermi, Enrico (1901-55), physicist, b. Rome. Studied at Pisa and at Göttingen and became prof. in Rome (1927). Awarded the Nobel Prize in 1938 for experiments on artificial radioactivity caused by neutron bombardment. Prof. at Columbia (1939), and took a leading part in the atomic bomb project in the U.S.A. Prof. at Chicago Institute of Nuclear Studies, 1945. He made many contributions to the theory of nuclear

and extranuclear processes, including beta-emission and hyperfine structure of spectral lines, and also to statistical mechanics.

Fermo (anc. **Ferrum Picenum**), It. tn. in the Marche (q.v.), 23 m. NE. of Ascoli Piceno (q.v.). It was founded as a Lat. colony in 284 BC after the conquest of the Picentes (see **PICENUM**). It has an archiepiscopal cathedral (partly 13th cent.), and an agric. college. There are bronze-founding and cotton-milling industries. Pop. (tn) 22,900; (com.) 27,700.

Fermoy, mkt tn in co. Cork, Rep. of Ireland, about 20 m. from Cork, on the R. Blackwater. The extensive military barracks on the N. bank of the riv. were destroyed in 1921; the grounds and remaining buildings have now been taken over for industry. Prominent buildings are the Rom. Catholic church and college (St Colman's). F. is the centre for salmon and trout fishing on the Blackwater, and has large flour mills at Clondulane (3 m.). Pop. 4212.

Ferrum Picenum, see **FERMO**.

Fernández, John, Portuguese navigator, reputed to be the first European to visit the interior of Africa. In 1446 he went with an expedition under Antonio Gonzales to Africa, where, being anxious to glean information for his patron, Prince Henry, he remained in the country for 7 months after the departure of his companions. His account of his travels among the desert tribes and in W. Africa bears a remarkable resemblance to that of Mungo Park. The dates of his birth and death are not known.

Fernández, Juan, Sp. navigator, who in 1572, while sailing from Peru to Chile, came upon a small group of is. in the Pacific which now bear his name. In 1574 he left Chile, sailing in a south-westerly direction, and came upon an is. which so greatly attracted him and his companions that he formed the intention (apparently never carried out) of revisiting it with a larger expedition. It has been conjectured that this is. was New Zealand.

Fernández de Avellaneda, Alonso, Sp. novelist, pseudonym of a writer who anticipated Cervantes in publishing *Segundo tomo del ingenioso hidalgo don Quijote de la Mancha* in 1614, as a sequel to *Don Quijote*. His real name is unknown. It is a work of some merit, but cannot compare with Cervantes's masterpiece. See E. Cotarelo y Mori, *Sobre el Quijote de Avellaneda*, 1934.

Fernández de Moratin, Leandro (1760-1828), Sp. poet and dramatist, b. Madrid, son of the poet Nicolás F. de M. On the recommendation of Jovellanos he became secretary in 1787-9 to the Sp. embassy in Paris. He travelled extensively all over Europe. Of his 5 comedies the best are *La Comedia nueva*, 1792, a satire on the extravagant dramas of the day, *El Sí de las Niñas* (Little Girls' Consent), 1806, and the satire *La Mogigata* (The Female Hypocrite), 1804. His plays are full of subtlety and psychological insight. He also trans. Molière's *Ecole des Maris* and

Le médecin malgré lui. His complete works were ed. by Ruiz Morcende in *Colección castellana*, 1924.

Fernandina, city and port of entry of Florida, U.S.A., in Nassau co. It is situated on Amelia Is., at the mouth of St Marys R.; its harbour opens on the N. to Cumberland Sound, and may be entered at high tide by vessels drawing 20 ft of water. It is a fishing and pulp-milling centre, and exports phosphate, lumber, and naval stores. Pop. 4420.

Fernando de Noronha, is. (7½ sq. m.) in the S. Atlantic belonging to Brazil. It takes its name from its Portuguese discoverer (1503), the count of Noronha. It has a rugged surface and healthy climate (average temp. 78° F.), and is the seat of a Brazilian penal station. Pop. 1322, all males, consisting mainly of criminals and their guards.

Fernando Po, is. in the Bight of Biafra, W. Africa, which belongs to Spain and is considered to be one of the most fertile spots on the W. African coast. Its surface is mountainous, and a great portion of the is. is covered with dense forests of valuable timber. The climate is very hot, and a pestilential wind, the 'harmattan,' carrying minute particles of sand from the Sahara, is seasonal. The chief products are cocoa and palm oil. The cap. is Santa Isabel (pop. 8300). The is.'s affairs are administered by a governor-general and council subject to control of the colonial dept in Madrid. Much has been done to develop the resources of the is. and to improve the social services. Labour was, until recently, imported from Liberia under unsatisfactory conditions. This was the subject of an enquiry by the League of Nations.

Ferndale, city in Oakland co., SE. Michigan, U.S.A. It manufs. auto parts, synthetic paint and resins, and metal products. Pop. 29,700.

Fernel, Jean François (1497-1558), Fr. physician and mathematician, b. Montdidier, Somme. He attended the univ. of Paris where he graduated M.A. in 1519 and spent the next 5 years as a recluse reading classical texts and studying mathematics. He then began the study of medicine and obtained his M.D. in 1530. Meanwhile in 1527 he pub. *Monasophaerium*, a treatise mainly on the astrolabe, and in 1528 *Cosmotheoria*, a treatise on the shape and size of the earth, and *De Proportionibus*, a mathematical work. His first medical work, *De Naturali Parte Medicinæ*, 1542, was the first work devoted exclusively to physiology since the time of Galen. He next began to write a system of medicine but did not complete it; most of it appeared in his *Medicina*, 1554, part of which forms the first explicit treatise on pathology. Meanwhile he had pub. *De Abditis Rerum Causis*, 1548. His *De Luis Venerea Curatione*, pub. posthumously in 1559, was an important early work on syphilis. F. was physician to Henri II; for a time he served as prof. of medicine at Paris but resigned in 1550 because of the

demands of his phenomenally successful practice. He was a great humanist, with a burning desire to extend knowledge in the true spirit of the Renaissance. See *The Endeavour of Jean Fernel*, 1946, by Sir Charles Sherrington, which includes G. Plancy's life of F.; life by P. A. Capitaine, 1925.

Ferneŷ (-Voltaire), Fr. tn in the dept of Ain, 4 m. NW. of Geneva. It is famous as the dwelling-place of Voltaire, the Sage of Ferneŷ, who lived here 1758-78. Pop. 1300.

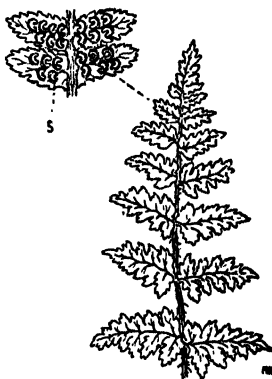
Fernguf, see FERRAGUS.

Ferneŷ, city of Brit. Columbia, in the E. Kootenay dist., situated at the junction of Coal Creek with the Elk R. There are extensive coal-mines in the neighbourhood, and about 480 coke ovens, which supply fuel for the smelting works in S. Brit. Columbia. Almost destroyed by bush fire in 1908. Pop. 2757.

Ferneŷ, tn in co. Wexford, Rep. of Ireland. It was once the seat of a bishop, and has given its name to the diocese of F. F. castle, 13th cent., is a perfect example of its kind. Pop. 1600.

Ferneŷ (Filicinae) comprise over 10,000 species, widely distributed in all parts of the world. They attain their highest development in the tropics. The tree F., Cyatheaceae (q.v.), are the largest representatives. The majority of F. are herbaceous with a creeping underground stem or rhizome, terminating usually in a rosette of pinnate or deeply divided leaves. A peculiarity common to F. is the coiled position of the young leaves, giving them at the tip the appearance of a crozier, whence their vernation is said to be circinnate, and the leaves continue to grow at the apex until their full size is attained. Peculiar brownish scales, known as paleae or ramenta, often fringed, invest the stems, petioles, and sometimes also the leaves of most F. F. vary very much as regards their branching; in some, as in the bracken F. (*Pteridium aquilinum*), the stem forks at the apex; in a few, as in some filmy F., the branching is axillary, like that of flowering plants, while in others, as in some of the tree F., the stem does not branch at all. The roots which are found on a full-grown plant are all adventitious, for the original main root of the embryo dies away very early. The reproduction organs are spores which are produced in cases called sporangia. Each group of sporangia is known as a sorus which may or may not have a protective covering, the indusium. In most cases the sori are borne on the under surface of the leaves. When ripe the sporangia burst and liberate the spores, which on germination give rise to what is known as a prothallus. The prothallus is a flat, heart-shaped, green body, which leads quite an independent existence, and which produces sexual organs. The male organs (antheridia) and female organs (archegonia) are borne on the under surface of the prothalli. In the antheridia are produced the spermatozooids, which are free-swimming; male gametes, and one of these enters an

archegonium and fertilises the female gamete contained therein. This process cannot be observed by the naked eye. The fertilised ovum becomes the embryo of the F. plant. Thus the life hist. of a F. presents a true alternation of generations: the F. plant, or sporophyte generation, produces asexual spores, which grow into the gametophyte (prothallus) or sexual generation. This in its turn produces male and female gametes, which after fertilisation grow again into the sporophyte. Occasionally asexual reproduction is effected by budding, as in *Asplenium bulbiferum*.



MALE FERN
S. sori

The form and position of the sori and the presence or absence of an indusium are characters upon which are based the classification of F. Most of the Brit. F. belong to the family Polypodiaceae, which includes *Pteridium* (bracken), *Adiantum* (the maiden-hair), *Asplenium ruta muraria* (the wall rue), *Phyllitis scolopendrium* (the hart's-tongue), which has entire leaves, *Polystichum*, *Polypodium*, etc., etc. *Osmunda regalis*, the royal fern, belongs to another family; it is peculiar in that the upper pinnae of the leaves are fertile and develop little or no green, so that there is all the appearance of a flower. There are many species of fossil F., which proves them to have formed part of the flora of the geological ages; tree F. are met with in the Devonian period, and many forms were abundant in Carboniferous times.

F. are largely cultivated in gardens and greenhouses for decorative purposes on account of their graceful foliage. Bracken, when dried, can be used for stable purposes and thatching, and its root stock contains starch, which, however, is only used when there is a scarcity of food. The only medicinal fern products are the oil from the male fern and a syrup extracted from the rhizome of an Amer. maiden-hair.

F. are shade-loving plants, and like plenty of moisture and soil containing leaf mould. They should be transplanted in early spring or late autumn, and are divided by their rhizomes. This applies to the harder forms. The more tender F. require glass, with uniform temp. and moisture. The soil must be light and well drained, so that the abundance of water which they require will not rot them. They should be repotted before the roots become pot-bound.

Ferns, Filmy, see FILMY.

Ferns, Flowering, see OSMUNDA.

Ferns, Male, see MALE FERNS.

Ferns, Sweet, see COMITONIA.

Ferozepore, see FIROZPUR.

Ferraboso, Alfonso (1543-88), the Elder, lt. composer, son of the singer and composer Domenico F. (1513-74), appears to have settled in England before 1562, but afterwards returned to Italy. He was the most important of the lt. musicians who lived in England in the 16th cent., but he left in 1578 to enter the service of the duke of Savoy at Turin, leaving his children in Eng. He wrote madrigals, lute pieces, motets, etc.

Ferraboso, Alfonso (c. 1575-1628), the Younger, Eng. composer of lt. descent, son of Alfonso F. the Elder (q.v.). He was left in England when his father returned to Italy. It is believed that Elizabeth I paid for his musical training; and he became a musician at the court of James I. His works include a number of masques, fantasies, and pavans for the viol, ayres with lute and bass viol, and contributions to Leighton's *Teares or Lamentations*. His 3 sons, *Alfonso* (c. 1620-before 1660), *Henry* (c. 1623-58), and *John* (c. 1626-82), were court musicians too, and Henry's daughter *Elizabeth* (1640-?) was a singer.

Ferragus, **Ferracute**, **Ferragut**, **Fernguf**, or **Veernagu**, celebrated giant of medieval romance. In *Valentine and Orson* he is described as a giant of Portugal who took Bellissant under his care after she had been divorced by Alexander, emperor of Constantinople, and as being in the possession of a brazen head which could answer any question put to it. In Turpin's *Chronicle of Charlemagne* he is a giant 36 ft high, with the strength of 40 men, and invulnerable as regards his skin; while in *Orlando Furioso* he is described as a Saracen, son of Lanfusa. Orlando slew him with a wound in the navel, his only vulnerable part.

Ferrandina, lt. tn, in Basilicata (q.v.), 15 m. SSW. of Matera (q.v.). Pop. 8000.

Ferrar, Nicholas (1592-1637), theologian, b. London, and educ. at Clare Hall, Cambridge. He was elected to parliament in 1624, but he retired to Little Gidding in Huntingdonshire in 1625, where he organised what was in effect a small religious community. He was visited by Charles I in 1633, but his 'Arminian nunnery' was broken up by the parliament in 1647.

Ferrara, Andrea, a name frequently found on the blades of broadswords of the 17th and 18th cents., especially Scottish

ones. It has been suggested that it refers to one Andrei dei Ferari of Belluno in N. Italy, who worked in F. at the end of the 16th cent., but this is unlikely. The name came to have a typological rather than a personal significance. Most blades bearing this name were probably made at Solingen in Germany and exported.

Ferrara: 1. Prov. of Italy, in NE. Emilia-Romagna (q.v.). It is a fertile plain, bordered on the N. by the Po (q.v.) and on the S. by the Reno. Its coastline in the W., on the Adriatic, contains sev. lagoons, of which the largest is that of Comacchio (q.v.). The prov. comprises the greater part of the anct duchy of F. (see ESTE, HOUSE OF). Area 1040 sq. m.: pop. 427,000.



W. F. Mansell

FERRARA CATHEDRAL

2. lt. city, cap. of the prov. of F., on the Po di Volano, 28 m. NNE. of Bologna (q.v.). It was ruled by the family of Este (q.v.) from 1208 until 1598, when it was annexed to the States of the Church (q.v.). Under the domination of the house of Este F. contributed greatly to the Renaissance (q.v.) in Italy; in the 16th cent. it was known for its school of painting (see ITALIAN ART), and in the 16th cent. it was a literary centre. The huge red brick Gothic castle of the Estes dominates the centre of the tn. There are numerous palaces and mansions, of which the most celebrated are the 14th-15th-cent. Schifanoia palace (now a museum), the Renaissance palace of Lodovico il Moro (also now a museum), the Diamond palace (now a picture gallery), and the beautiful 16th cent. house of Princess Maria. The archiepiscopal cathedral (1135) has a celebrated Romanesque-Gothic façade. The univ. (1391) has an important library (1753). Savonarola, Guarini, and Bentivoglio (qq.v.) were b. at F.; Tasso (q.v.) was confined in the hospital of St Anne during his period of insanity (1579-86), and the tn provided a refuge for Calvin and Marot (qq.v.). There is a large trade, in agric. produce, fruit, and wine, and there are distilling, engineering, pottery,

hoisery, sugar, rope-making, and furniture industries. Pop. 140,000.

Ferrari, Gaudenzio (c. 1484-1546), painter and sculptor of the Lombard school, b. Valuggia, near Novara. He was a pupil of Stefano Scotti at Milan, but made his greatest advance by a minute study of the pictures of Leonardo da Vinci. His works are remarkable for the elevation of their style as well as for the display of difficult and uncommon attitudes. His best are at Varallo, 'The Crucifixion,' a fresco which contains 26 life-size figures; 'Scenes in the Life of Christ,' consisting of 21 pictures; 'A Glory of Angels,' frescoes at Saronno, near Milan; 'The Martyrdom of St Catharine,' in the Brera Gallery, Milan; 'Pieta,' in the Royal Gallery, Turin. See B. Berenson, *The North Italian Painters of the Renaissance*, 1907.

Ferrari, Luigi (c. 1522-60), It. mathematician who at the age of 15 was employed as a servant in the household of Cardan (q.v.). F. was the first to solve a biquadratic equation, for which credit was given to him by Cardan. F. subsequently became prof. of mathematics at Bologna but d. young.

Ferrari, Paolo (1822-89), It. dramatist, b. Modena. He continues the tradition of Goldoni. His works are characterised by their vivacious dialogue and fresh and piquant style, though many are forced and confused in plot. His later plays are influenced by Augier and Dumas fils. His prin. works are: *Goldoni e le sue sedici commedie nuove*, 1851, *La salira e Parini*, 1854, *Opere Drammatiche*, 41 vols., 1877-1881.

Ferraria (in honour of J. B. Ferrari, an It. botanist), a genus of Iridaceae; dwarf bulbous plants of South Africa. They have glaucous leaves of a dull but sometimes beautiful colour and large greenish-brown flowers.

Ferrates, salts of the unknown ferric acid, H_2FeO_4 , discovered by Fremy in 1841. The sodium, potassium calcium, and magnesium salts are dark red, crystalline, and soluble in water. The Barium salt is sparingly soluble.

Ferreira, Antonio (1528-69). One of the classic poets of Portugal, b. Lisbon. He was judge of the supreme court at Lisbon, composing in his leisure the poetry which earned for him the sobriquet of 'the Portuguese Horace,' and gave him a reputation equal to that of Camoens (q.v.). He wrote numerous striking sonnets, elegies, and odes, but his poetic fame rests mainly on his epistles. Also wrote dramas, *Inês de Castro*, in which he invested with the forms of Gk tragedy the most poignant and popular events of Portuguese chronicles; and 2 comedies, *Brieto* and *Cioso*. His collected works pub. in Lisbon, 1771, and Paris and Rio de Janeiro, 1865. He d. of the plague. See life by J. de Castilho, 1865.

Ferrel's Law is that everything moving in any direction on the earth's surface is subject to a deflecting force owing to the rotation of the earth—in the N. hemisphere the force deflects to the right, and

in the S. hemisphere to the left. This is especially applicable to the air when in motion—the winds of the N. hemisphere being deflected to the right and those of the S. to the left.

Ferrer, Francisco (1859-1909), Sp. revolutionary, b. Aella, near Barcelona. After taking part in an insurrection in Spain, he earned a precarious living in Paris for a time as a teacher. In 1901 he opened a school, the Escuela Moderna, in Barcelona. This school was really a Socialist propagandist centre, though it did much for educational reform in Spain. After the attempt in 1906 on the lives of the king and queen of Spain, F. was arrested and the school closed. F. was, however, acquitted, only to be again arrested, in 1909, for taking part in anti-Catholic riots in Barcelona. Convicted on hearsay evidence, he was condemned to death by the Council of War and executed. See life by W. Archer, 1911.

Ferrers, Lawrence Shirley, 4th Earl (1720-60), was the last member of the peerage who was put to death as a criminal in England. In the year 1760, while in a fit of temper, he shot his steward, for which crime he was convicted of murder by his peers and hanged at Tyburn.

Ferret, animal belonging to the family Mustelidae, other species being the badger, weasel, otter, and polecat. The F. is the domesticated albino variety of the latter animal, both of them belonging to the genus *Putorius*. It is very similar to the wild polecat, but a little smaller, being about 14 in. long, has yellowish-white fur and pink eyes. Sometimes, however, F.s breed with polecats, and the result is a cross-breed having fur tinged with brown. The F. is not altogether tame, and occasionally it becomes quite ferocious, exhibiting no affection whatever. The female F. breeds twice during the year, producing from 6 to 9 young ones each time, and she has been known to devour them. This animal was known among the Romans, who employed it, and it is said that it was brought from Africa to the S. parts of Europe. It is used especially to hunt rabbits, and to kill rats. See N. Kverett, *Ferrets*, 1897; W. D. Drury, *Ferrets and Ferreting*, 1927.

Ferric and **Ferrous Salts**, see IRON AND STEEL.

Ferricyanogen, Ferricyanides, Ferrocyanogen, and Ferrocyanides. *Ferricyanogen* and *Ferrocyanogen* are 2 isomeric compound radicles containing cyanogen and iron, whose exact chemical structure has only recently been elucidated. The ferrocyanogen compounds are either prepared from the potassium salt or from the cyanogen compounds obtained as by-products in the coal-gas manuf. or synthetically. *Potassium Ferrocyanide* is produced by heating crude potash in an iron pot closed by a lid having an aperture through which iron filings and certain animal matter, as feathers, horns, and leather, are introduced. The reaction is not well understood, but when the fused mass is lixiviated potassium ferrocyanide

($K_4Fe(CN)_6$) is contained in the solution. It forms quadratic pyramidal crystals of lemon-yellow colour soluble in warm water. It is used in calico-printing and in the preparation of Prussian blue, etc. The ferrocyanides of sodium, calcium, zinc, barium, strontium, and many other metals have also been prepared, and sev. insoluble ferrocyanides are made by double decomposition. Thus copper sulphate and potassium ferro-cyanide solutions mixed give soluble potassium sulphate and a brown coloured precipitate of cupric ferrocyanide ($Cu_2Fe(CN)_6$). This is used in the preparation of semi-permeable membranes (see Osmosis). *Ferrocyanic acid* is obtained by adding pure hydrochloric acid to an equal vol. of a saturated solution of potassium ferrocyanide, excluding air as far as possible. It is a white powder crystallising in small needles, is soluble in water and alcohol, and readily oxidises on exposure to air. *Potassium ferrocyanide*, or red prussiate of potash, $K_4Fe(CN)_6$, is formed when potassium ferrocyanide is oxidised, e.g. by bromine water. It crystallises in dark red prisms and is a powerful oxidising agent. Many insoluble ferrocyanides can be made from a soluble ferrocyanide and a soluble metallic salt. *Hydroferrocyanic acid* or *ferrocyanic acid* ($H_4Fe(CN)_6$), made by adding 3 vols. of very strong hydrochloric acid to 1 of strong potassium ferrocyanide, is a brown-green crystalline body. *Hydrogen ferrous ferrocyanide* is a white powder obtained by boiling an aqueous solution of ferrocyanic acid. The potassium salt, when heated with dilute nitric acid, forms Prussian blue, which exists in sev. varieties, e.g. *soluble Prussian blue*, *insoluble Prussian blue*, *Williamson's blue*, and *Turnbull's blue*. Prussian blue itself is hydrated ferric ferrocyanide; the soluble Prussian blues are hydrates of potassium ferric ferrocyanide, $KFe_3(Fe(CN)_6)_2 \cdot 4H_2O$. The iron atoms in Prussian blue are arranged, ferrous and ferric alternately, at the corners of a cubic lattice, and the CN groups lie in the edges of those cubes. The potassium atoms lie at the centres of alternate cubes. Prussian blue is used as a pigment.

Ferrier, Sir David (1843-1928), physician, b. Woodside, Aberdeen, and educ. at the Univ. there and also at Heidelberg. He became F.R.S., 1876; and was appointed prof. of neuropathology in King's College, London, 1889. He made experimental researches on the localisation of function and diseases of the brain and wrote many medical works, including *Functions of the Brain*, 1876, and *Localisation of Cerebral Diseases*, 1878-80. He was a founder, and for a time editor, of *Brain: a Journal of Neurology*. President of the Medical Society of London, 1913; knighted 1911.

Ferrier, James Frederick (1806-64), metaphysician, b. Edinburgh, and the nephew of Susan F. and of John Wilson ("Christopher North"). Educ. at Edinburgh High School and Univ. and at Magdalen College, Oxford; he was called to the Scottish Bar 1832, and appointed

prof. of civil hist. at Edinburgh, 1842, and prof. of moral philosophy and political economy at St Andrews, 1845. After having contributed various metaphysical essays to *Blackwood's Magazine*, he pub. *The Crisis of Modern Speculation*, 1841, *Berkeley and Idealism*, 1842, and *The Institute of Metaphysics*, 1854. His *Lectures on Greek Philosophy* were ed. in 1866 by Sir A. Grant, who also wrote a life. See also life by E. S. Haldane, 1899.

Ferrier, Kathleen (1912-53), contralto singer. She was b. in Lancs, where she took a diploma for the pianoforte and had begun work as a telephonist before she began to take singing-lessons after winning a prize at a musical festival. She sang in factories and for the forces during the Second World War, and soon afterwards made a great impression as a concert singer and in opera, where she first appeared in Britten's *Rape of Lucretia* in 1946. Very successful tours in Europe and America followed. To a voice of exquisite quality she added sensitive understanding and musicianship, which were enthusiastically recognised everywhere, but her career was unhappily cut short by cancer, from which she already suffered cruelly when she appeared for the last time, in Gluck's *Orpheus* at Covent Garden in Feb. 1953.

Ferrier, Paul (1843-1920), Fr. playwright, b. Montpellier. His plays include *La Revanche d'Iris*, 1868, *Chez l'Avocat* and *Les Incendies de Moussolard*, 1873, *Les Mousquetaires au Couvent*, 1880, *Babolin*, 1884, *Joséphine vendue par ses Sœurs*, a famous opéra-bouffe with music by Victor Roger, 1886, *Le Pétiche*, 1890, *Le Carillon*, 1896. He also wrote libretti for operas by J. Offenbach, A. Messager, and Gabriel Pierné.

Ferrier, Susan Edmonstone (1782-1854), novelist, b. Edinburgh, the daughter of James F., a clerk of the court of session with Sir Walter Scott. Her first work, *Marriage*, appeared in 1818, and was followed by *The Inheritance*, 1824, and *Destiny, or the Chief's Daughter*, 1831. These novels are very lively presentations of Scottish society, and show a rare gift of observation. They were all pub. anonymously, and many conjectures were made as to their authorship; some people attributed them to Scott, who greatly admired her writings and of whom she wrote in her *Recollections of Visits to Ashetiel and Abbotsford*, pub. with a memoir in Bentley's ed. of her works (6 vols.), 1882. The latest ed. is by Lady Margaret Sackville, 4 vols., 1928.

Ferring, seaside vil, near Worthing, Sussex, England. It is situated between the S. Downs and the sea immediately W. of Worthing. There is a prehistoric camp and the site of a Saxon cemetery, which were purchased for the National Trust in 1938 by the W. Sussex Co. Council, the Worthing Corporation, and the Worthing Rural Dist. Council.

Ferro, see **HIEMO**.
Ferro-concrete, see **REINFORCED CONCRETE**.

Ferro-magnetic, see INDUCTION, MAGNETIC.

Ferro-manganese, commercial alloy consisting of: iron, 4 to 6 per cent; manganese, 50 to 80 per cent; carbon, 5 to 6 per cent; and silicon in small and varying amounts. It is used commercially in the manuf. of other alloys, and chemically as a reducing agent.

Ferro-silicon, alloy consisting of: silicon, 10 to 95 per cent; manganese, 2 to 3 per cent; carbon, 1 per cent; and iron the remainder. It is used in the formation of other alloys of iron or silicon, and also as a reducing agent.

Ferrol (Del Caudillo), El, Sp. port in the prov. of La Coruña. It is in a strongly fortified fiord, opening off the bay of Coruña, and is the prin. naval dockyard of Spain. It is also an important mercantile port, and has arsenals, fisheries, and linen manufs. It fell to the insurgents early in the Civil war of 1936-9. Pop. 70,050.

Ferrotypes, Tintype, or **Energiatype** is a photographic process of the wet collodion type, in which a direct positive image is produced on a thin black enamelled iron plate. The discovery is credited to Robert Hunt in 1844.

Ferry, Jules François Camille (1832-93), Fr. statesman, b. Saint Dié, Vosges. He studied for the Bar, but soon devoted himself entirely to politics. Elected Republican deputy for Paris in 1869, he strongly urged that peaceful relations should be maintained between France and Germany, but without effect. Created prefect of the Seine in 1870, he had the full responsibility of the siege of Paris, and was forced to resign his prefectship in 1871. He became a member of the Republican ministry formed in 1879, and eventually became minister of education and then minister of Foreign Affairs. He was twice premier, and it was during his administrations that 2 important measures were carried out, the organisation of public education free from clerical influence and the colonial expansion of the Fr. empire. A Fr. protectorate was formed in Tunis (1881), and the conquest of Indo-China, and exploration of the Congo and Niger dists. were planned. But his spirited colonial policy involved France in war in Madagascar, and brought about his own downfall in 1885. He was assassinated by a madman. See lives by A. N. Rambaud, 1903, and A. Billot, 1904, and A. Israel, *L'École de la République; le grand œuvre de Jules Ferry*, 1931.

Ferry, 'a place where boats ply regularly across a riv., or arm of the sea, for the convenience of goods and persons' (Ferries Committee report). F. is also the name given to the boat which holds the passengers. Examples may be seen at South Haven Point, at the head of Studland Bay, in Dorset, where the F. plies across an arm of the sea to the sandbank, and at Twickenham, near London, where the F. crosses the R. Thames. The right to F. is a franchise or royal grant, and has the same legal significance as the right to hold a fair or market. It has

nothing to do with the ownership of land or water. The possessor of the F. is not entitled to ownership of the stretch of water across which his passengers are ferried. He merely has the right to exact reasonable toll for the service he has rendered in supplying boats for the landing of passengers and goods on the other side. He is, moreover, responsible for the condition of his boats and for the ferryman he employs. No one is allowed to set up an opposition F. or establish a new F. unless authorised by Act of Parliament. Train-F.s are vessels used for trains and have railway lines placed across their decks. Vehicular F.s enable cars, etc., to run on and off the vessels on their own wheels. There are many varieties of F. boats, such as rafts and flat-bottomed barges with inclined planes for horses. The flying-bridge is worked by means of a long rope or chain attached to a fixed buoy in the middle of the riv., and is useful in military operations. Proposals for improving 32 F.s and starting new F.s were made by the Ferries Committee's report to the minister of transport, June 1948 (*Ferries in Great Britain*, H.M.S.O., 1948). Other recommendations ranged from the provision of additional or larger vessels to the use of radar or other navigational devices on services liable to interruption by fog. The report also recommended that highway authorities should be empowered to take over F.s linking trunk or classified roads and that these should be treated as part of the highways and freed from tolls, expenditure being met in part by gov. grants. In Britain 45 vehicular F.s are normally in use, 7 of them free from tolls.

Ferry-Port-on-Craig, see TAYPORT.

Ferryhill, tn in co. Durham, England, 6 m. S. of Durham. Coal-mining is the prin. industry. Pop. 11,000.

Fersen, Hans Axel, Count (1755-1810), Swedish marshal, b. Stockholm, son of Fredrik A., Count F., of Scottish descent, from McPhersons. Colonel in Royal Swedish regiment of Louis XVI of France, served in Amer. War of Independence. In the flight of Louis and Marie Antoinette to Varennes, June 1791, F. made the preparations and accompanied them. F. was almost certainly infatuated with Marie Antoinette, and some sources have suggested that he was actually her lover. Later he returned to Sweden, where he was murdered by the mob in Stockholm tn hall on account of a false rumour that he had poisoned the crown prince Charles Augustus.

Ferté-sous-Jouarre, La, Fr. tn in the dept. of Seine-et-Marne, on the Marne. The 7th-cent. crypt of a former Benedictine abbey remains. Agric. machinery is manufactured. Pop. 3900.

Fertilisation, fusion of sexual elements in the reproductive processes of animals and plants. The essential fact of F. is that a gamete or sexual cell from the reproductive tissues of one parent becomes so intimately associated with a gamete from the reproductive tissues of the other parent as to form one cell called

a zygote, which becomes the starting point of a new living individual. Where there is no F. in the process of reproduction, the development of the new organism is called *parthenogenesis*. In some of the lower plants and animals the fusing gametes are indistinguishable in form, size, and other characteristics. Such sexual processes are called isogamous, and the term conjugation is to be preferred to F. The term F. now becomes restricted to that process by which a cell derived from the specialised tissues of a parent known as male is united to a cell derived from corresponding specialised tissues in the female parent. It is therefore a process characteristic of the higher animals and plants where sexual organs are differentiated into male and female. In animals the organs from which the gametes are derived are the testes in the male and the ovaries in the female. The male gamete is the spermatozoon, a small cell of elongated form. The nucleus is situated in the 'head' or thickened part, and the remainder consists of a vibratile tail by which the cell moves freely in a liquid medium. The female gamete is the ovum, a cell usually much larger than the spermatozoon. It is quiescent or non-motile, containing a large nucleus and a large amount of nutritive material enclosed in a protecting membrane. Ova are produced in small quantities, while spermatozoa are relatively far more numerous. The ovum and spermatozoon come into conjunction by the admixture of the seminal fluid in the sexual act. The actual fact of F. consists of the penetration of the envelope of the ovum by the spermatozoon. This is probably brought about by *chemotaxis*, or attraction of a chemical nature exerted mutually by the male and female elements. What happens is that the nucleus of the spermatozoon enters the ovum and sometimes the centrosome does so. With the formation of the zygote by this fusion of cells, the embryonic hist. of the new organism begins. In plants there are many modes of the sexual process. In certain algae similar gametes, furnished with cilia, move about in the water and eventually fuse; this process is isogamous. In other plants the male cell is a spermatozoid which visits the female cell. In the mosses, for example, the spermatozoids are developed in large numbers in the *antheridium*, and are set free to move in the water by means of 2 vibratile cilia. The *archegonium* contains the ovum at the bottom of its flask-shaped structure. When the ovum is ready for F., a passage is opened through the archegonium, through which the spermatozoid reaches the ovum. In the phanerogams, or flowering plants, the male element is contained in the pollen of the stamen, which has to be conveyed in some manner to the female element, the ovule of the stigma. F. in flowers is therefore necessarily preceded by pollination, and the special structure of the flower is adapted to that end. Wind is often an active agent in pollination; in this case the pollen is produced in enormous quantity and the

stigmas are often feathery so as to catch the pollen. Insects are, however, the great carriers of pollen, and the colour and scent of the flower serve to guide the appropriate insects to their favourite flowers. When the pollination is effected, the male cell passes from the pollen-tube into the female cell, and a zygote is the result of the fusion. It has been shown that cross F. is the rule even when male and female organs are found on the same individual. In many cases this is ensured by the male and female elements in the same plant ripening at different times. The chemical attraction which effects the fusion is only operative between cells of a certain degree of affinity, that is, it generally means that F. can only take place between cells of individuals of the same species. In that one phenomenon the potential characteristics of both parents are fused, and may reappear in the new organism when developed (see MENDELISM). See Wilson, *The Cell in Development and Inheritance*, 1902; D. M. Mottier, *Fecundation in Plants*; F. H. A. Marshall, *The Physiology of Reproduction*, 1932; R. Kuczynski, *Fertility and Reproduction*, 1933; N. M. V. Rothschild, *Fertilisation*, 1956.

Fertilisers, see MANURES.

Fertility of Soil, see SOIL.

Fertő Tó, see NEUSIEDLERSEE.

Ferula, family Umbelliferae, a genus of tall, herbaceous perennials, of the Mediterranean region and Central and W. Asia, with much divided leaves and thick roots, sometimes known as giant fennels, grown in gardens for foliage beauty. *F. sambul*, the Sambul plant, has a milky, musky sap, used as a musk substitute in Russia, and as a remedy in cholera; *F. asafoetida* and *F. narthex* give gum asafoetida; *F. communis v. brevifolia*, gum ammoniac, and *F. galbaniflua*, gum galbanum; all reputed to have medicinal value. *F. communis* and varieties, and *F. tingitana* are esteemed for gardens.

Fescennine Verses (*Versus Fescennini*), early form of popular poetry in Italy. They took the form of a dialogue, usually in the Saturaian metre, and were composed extempore at weddings and other private festivals. They became so licentious that the practice had to be suppressed by law. See Horace, *Epistles*, li. 1, 145.

Fescue Grass, name given to *Festuca*, a genus of perennial grasses (q.v.): *F. pratensis*, the meadow F., *F. arundinacea*, tall F., *F. ovina*, sheep's F., *F. gigantea*, tall brome, and *F. rubra*, the red F., are common species in Britain.

Fess, or **Fesse**, see HERALDRY, *Ordnaries* (2).

Festa, Camstanzo (1490-1545), It. composer of madrigals and motets. In 1517 he was appointed singer in the Vatican. F. is chiefly remembered for his very popular madrigal *Down in a Flowery Vale*, which was trans. by Thomas Oliphant.

Festival, see FEAST.

Festoon, in architecture, sculptural wreath or garland, formed of conventional flowers, fruit, and leaves, suspended by

ribbons. It was used by the Greeks and Romans probably in imitation of the garlands of flowers that were hung about a sacrificial victim or altar; and may be found as a decorative feature in many Renaissance buildings. Also called a 'swag.'

Festubert, Battle of (N. France, 20 m. SW. Lille). On 9 May 1915 Sir Douglas Haig opened an attack on the Germans just N. of Fromelles and also between Neuve Chapelle and Givenchy, F. being in the latter sector. This attack was undertaken in pursuance of a promise made by Sir J. French to Marshal Joffre to keep the enemy occupied on his front as long as possible. Some ground was gained about Fromelles, but the Ger. machine-guns on the Aubers Ridge held up the advance in that area, and bad weather then held up progress. On 15 May the attack was resumed between Richebourg-L'Avoué and F., in which the Canadian Div. distinguished itself. On 16 May the 7th Div. made good progress immediately due E. of F., having for its objective the line Rue l'Ouvert-Canteleux.

By the capture of the orchard at F. on 20 May the Canadians (16th Canadian Scottish) again distinguished themselves. This position had been strongly fortified by the Germans. The result of the battle of F. was to deprive the Germans of a highly entrenched and fortified area on a 4-m. front. Their losses in personnel and material also were heavy.

Festus, Porcius, Rom. procurator of Judaea, in which office he succeeded Antonius Felix (q.v.) in AD 60. He bore testimony to St Paul's innocence when the apostle was arraigned before him. See Acts xxiv., xxv.

Festus, Sextus Pompeius (fl. late 3rd cent. AD), Rom. lexicographer. His epitome of Placcus's *De Significatu Verborum* is extant in a single imperfect MS. as well as in a further epitome by Paul the Deacon (8th cent.). See W. M. Lindsay, *Glossaria Latina*, LV, 1930.

Fet (real name Shenshin), Afanasiy Afanas'yevich (1820-92), Russian poet, an outstanding representative of the 'art for art's sake' school, an impressionist, lyricist, and mystic (*Evening Lights*, 4 vols., 1883-91). He made excellent trans. of classical Lat. poets and of Shakespeare, Goethe, and Schopenhauer.

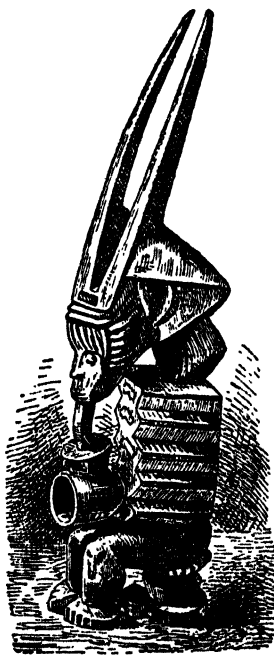
Fethard, anct mkt tn of co. Tipperary, Rep. of Ireland, 8 m. N. of Clonmel. Pop. 1000.

Fétiiales, see FÉCIALES.

Fétié, François Joseph (1784-1871), Belgian musical critic and composer, b. Mons, and trained by his father and at Paris. He was appointed organist and prof. of music at Douai, 1813; prof. at the Conservatoire, Paris, 1821; director of the Conservatoire, Brussels, and chapel-master to Leopold I, 1833. In 1827 he founded the *Revue Musicale*, and he wrote a *Biographie universelle des musiciens*, 1835-44, *Histoire générale de la musique*, 1869-76, and, in collaboration with Moscheles, *Méthode des Méthodes de Piano*,

1837. He also composed sev. operas and oratorios.

Fetichism, or **Fetichism** (Portuguese *fetico*, a charm), the worship of inanimate objects which are believed to be possessed with spirits; the word is also used to indicate the use of charms which, though not the habitation of spirits, are supposed to have a magical influence, derived from spirits, in warding off danger and bad luck. This cult is found especially among



A NIGER FETISH

W. African tribes. The term was first used in its present sense by 15th-cent. Portuguese explorers for the stones, wooden figures, beads, etc., worshipped by negroes. See also AMULET. The term F. is also used in psychology to describe types of obsessional mental or nervous disorder.

Fettes College, Edinburgh, public school for boys, founded by Sir Wm F. (d. 1836), who left a large endowment for the purpose of educating orphans and children in unfortunate circumstances. The Trust funds were allowed to accumulate till 1864, when the buildings were begun. The college was opened in 1870, and the administration is similar to that of an ordinary Public School.

Feu and Feu-duty. In Scots law, F. is a mode of land tenure which gives the feuar the right of holding in perpetuity certain property, in return for which he makes an ann. payment in money, called feu-duty. The land is 'held from the crown, but the crown vassals may give out their land in F. to their vassals, who in turn may F. the land. This process of subinfeudation was prohibited in England by the statute of Quia Emptores in 1290. See Rankine's *Law of Landownership in Scotland*.

Feu de joie, discharge of musketry given as a salute on occasions of public rejoicings. The guns are let off one after another at quick but regular intervals, thus producing a running fire.

Feuchtersleben, Ernst, Freiherr von (1806-49), Austrian poet and physician, b. Vienna. He was secretary to the Society of Physicians, and from 1844 delivered lectures on the training of psychic physicians. His philosophical and psychological studies had a wide influence. His works include: *Die Lehre von den Heilanzeigen* (in Lat.), 1833, *Gedichte* (containing 'Es ist bestimmt in Gottes Rat,' set to music by Mendelssohn, 1836), *Zur Dittetik der Seele*, 1838, *Beiträge zur Litteratur-, Kunst-, und Lebenstheorie*, 1837-41, and *Lehrbuch der ärztlichen Seelenkunde*, 1845.

Feuchtwanger, Lion (1884-), Ger. author, b. Munich, of a Jewish family. He studied philosophy in Berlin and Munich. In 1907 he pub. a widely-noticed dissertation on Heine's fragment *Der Rabbi von Bacherach*; also a play, *Der Felsch*. In 1910 appeared his first novel, *Der Iönerne Gott*. In 1916 came a tragedy, *Julia Farnese*; also a refurbishing of the old Ger. play *Vasanasena*. He adapted *The Persae* of Aeschylus in 1917; and the *Acharnians* and *Peace* of Aristophanes in the burlesque *Friede*, 1918. Of his dramas, *Warren Hastings* appeared in 1916, and *Jud Süß* and *König und Tänzerin* in 1917. He pub. the novel *Die hässliche Herzogin* in 1923, and the famous one *Jud Süß* in 1925 (trans. into Eng. as *Jew Süß* in 1926). It is a story of Germany in the 18th cent., a wonderful combination of Teutonic thoroughness, of workmanship, and Heb. imagination. Later plays: *Die Petroleuminsel* and *Wird Hill amnestiert?* 1927. His *Erfolg*, 1930, bears a close resemblance to A. Zweig's famous novel, *The Case of Sergeant Grischka*, being founded on the theme of the unavailing attempts of a determined woman to secure the freedom of a man wrongly condemned to prison. Like *Jew Süß* it is sketched on a great canvas, comprising scores of characters and all of them intensely vital. His trilogy *Josephus*, based on the life of the Jewish historian, was pub. in Eng. in 1933. Other works include: *Die Geschwister Oppermann*, 1933, *Der falsche Nero*, 1937, and his autobiography *Unholdes Frankreich*, 1941. Since 1941 F. has lived in California.

Feud (M.E. *fede*, through the Fr., from Old High Ger. *fehida*. Cf. D.E. *fäh*, *foe*),

a lasting quarrel, often resulting in warfare, between 2 families, clans, or tribes. See BLOOD VENGEANCE; VENDETTA.

Feudalism (late Lat. *feodum*, or *feudum*, a fee or fief), one of the most influential of medieval institutions, gave rise to legal principles and social ideas not yet extinct. The origin of F. is not generally agreed. Institutions have existed in Japan, Africa, and many other places, to which the term 'feudal' might be applied. But the system of medieval W. Europe is always meant. F. came into existence in the 8th and 9th cents., owing to the inability of the central gov. to cope with the disorders of the period. The 2 main features of F. are of Rom. origin: one related to land and the tenure by which it is held, and the other to the personal relationship of individuals. The latter was known in the time of the Rom. empire as 'patrocinium'; a poor and landless freeman goes to the rich landowner who can afford him protection, states his need, and offers such services as a freeman may perform in exchange for shelter and support. The other institution was the 'precarium'; under this form the owner granted the use of a piece of land to another. The object of this practice was not to obtain income, but to serve a friend, to reward a dependent, or to secure a debt, etc. Its chief characteristic from a legal point of view was that the lessee had no right of any kind against the grantor, as the land was revocable at the will of the owner with no penalty. When a small landowner was in trouble, he made over his land as a gift to a rich landowner near, and received it back as a precarium; this process was known as 'patrocinium fundorum.' When the Franks entered Gaul and found these customs prevalent, together with many other Rom. institutions, they legalised them. In this they were in all probability influenced by the pre-existence of the institution of the 'comitatus', which had much in common with the patrocinium. The latter had held no stigma for either of the parties entering into it, but in the case of the comitatus, not only was there no disgrace, but the transaction was considered to confer honour on both the chief and the dependent. All these ideas and customs, such as special ceremonies and oaths of allegiance, passed from the comitatus into the feudal system. The idea of the precarium also would not be totally opposed to Frankish ideas, though the practice was mostly carried on by the great landowners until the beginning of the Carolingian period. The Church was the chief agent in carrying over the precarium from the Rom. to the Ger. state; frequently grants of land were made by the Church on this system. The Merovingian period was not distinguished by any great change in the character of feudal institutions; the legalisation of the Rom. practices was the great achievement of that age. The most necessary steps to the formation of the historical feudal system were taken in the Carolingian period; those are the steps by which the 2 institutions of the patro-

onium and precarium became 2 sides of a single system. Military service had not previously been connected with the Rom. or Merovingian institutions, and the Carolingian age is remarkable as the period during which military service was estab. as a necessary corollary of F. Charles Martel made use of very extensive Church lands to be given to his followers in order that being thus relieved of some expense, they might be able to furnish cavalry to repulse the Arabian attack on Gaul; the method used was called 'precariae verbo regis.' This was the first step towards the unification of the 2 institutions; about this time the word 'benefice' displaced precarium and 'commendation' was used instead of patrocinium. The judicial functions of the state also passed into private hands during this period. As a result of the extension of the principle of military service, the duty of defending the state changed from a public obligation to a private agreement. So full sovereignty was exercised by the great lords over all residing within their 'fief,' as the benefice was called at this later period. In the majority of cases such power was usurped by the landowner. In the ideal feudal system the vassal always receives a fief, and a fief is held by none other than a vassal. Estates of allodial land, that is land which the original owner had held in fee-simple, not as a benefice, frequently formed little states of their own; if the pretensions of the owner were made good, they were distinctly recognised by the general gov. as independent states. F. was prevalent over W. Europe from the 10th to the 13th cents.; even where allodial lands were numerous, the real gov. was completely local. At the same time the theory of the state, with an almost absolute king at its head, was never allowed to lapse. The kings themselves never allowed the barons' claim to independence. Such a regular organisation as outlined in the legal theory nowhere existed in practice. A rough system of organisation obtained in most places. The national feudal system of the different countries of Europe presented many constitutional points of difference, and no exercised a different influence on the hist. of each country. See LAW and ENGLISH HISTORY, FRANCE, GERMANY, SCOTLAND, etc., for details of these systems. See also INCURAGE; FIEF; GRAND SERJEANTY; KNIGHT-SERVICE; VILLEINAGE.

Feuerbach, Anselm (1829-80), Ger. painter, b. Speyer, trained in Düsseldorf and Munich; was the pupil of Couture in Paris. After a visit to Italy, his subjects were drawn largely from ant. hist. and mythology, and before long he was recognised as the leading painter of the Ger. classic school. His chief works are: 'Iphigenia in Tauris,' 'Orpheus and Eurydice,' 'Pieta,' and 'Dante at Ravenna.' See lives by Allgeyer-Neumann, 2nd ed., 1904; O. Fischer, 1922; and L. Zahn, 1940.

Feuerbach, Karl Wilhelm (1800-34), Ger. prof. of mathematics at Erlangen. F.'s Theorem states that, In any triangle

the centre of the circumscribed circle, the common point of the altitudes, and the centre of the circle through the feet of the altitudes lie on one and the same straight line, whose mid-point is the last named point.

Feuerbach, Ludwig Andreas (1804-79), Ger. philosopher, 4th son of Paul J. A. F., b. Landshut, Bavaria, and educ. at Heidelberg, Berlin, and Erlangen. His first work, *Gedanken über Tod und Unsterblichkeit*, 1830, an attack on the doctrine of personal immortality, was followed by *Abdard und Heloise*, 1834. In 1837 he married a woman of some means, and was thus enabled to devote his time to study and reading, which resulted in the pub. of *Das Wesen des Christentums*, 1841, trans. into Eng. by George Eliot under the title of *The Essence of Religion*, 1853. This work is an attempt to prove that God, or the Absolute, is an outward projection of man's inner self, only existing in the human consciousness of the infinite. F. thus denies the existence of God apart from man, and maintains that the highest good is created in man's consciousness as an expression of his human needs. His complete works appeared in 10 vols., 1846-66, new ed. 1903-11. See A. Lévy, *La Philosophie de Feuerbach*, 1904; K. Barth, *Geschichte der protestantischen Theologie, seit Schleiermacher*, 1843.

Feuerbach, Paul Johann Anselm Ritter von (1775-1833), Ger. writer on criminal law, b. Frankfurt-on-Main, and educ. at the univ. of Jena. His *Kritik des natürlichen Rechts*, 1796, followed by *Anti-Hobbes*, 1798, attracted much attention, and in 1801 he was appointed prof. at Jena, and in 1802 accepted a similar position at Kiel. He became second president of the court of appeal at Bamberg (1814), and first president of the court of appeal at Anspach (1817). His works include *Merkwürdige Kriminalrechtsfälle*, 1808-11, *Betrachtungen über das Geschworenengericht*, 1811, and *Kaspar Hauser*, 1832. A collection of his *Kleine Schriften* was pub. in 1833. The *Leben und Wirken* were ed. by his son Ludwig (2 vols.), 1852. See M. Grünhüt, *Anselm von Feuerbach und das Problem der strafrechtlichen Zurechnung*, 1922.

Feuerbach, Ger. tn in the *Land of Baden-Württemberg* (q.v.), a NW. suburb of Stuttgart (q.v.).

Feuillants, religious order in France, a reformed branch of the Cistercians, founded in 1577 by Jean de la Barrière, the abbot of a Cistercian monastery at Feuillant near Toulouse. The stricter rules laid down by de la Barrière were ultimately confirmed by Pope Sixtus V, and a convent for the new congregation was founded in the Rue St Honoré, Paris, by Henry III. During the Fr. Revolution the name of F. was given to some moderate Jacobins, including Lafayette, Sieyès, Barnave, Charles de Lameth, and Barrère, who met in the building in Paris formerly occupied by the religious order. The object of the club (founded 1791) was to unite the old monarchy with the new

constitution. The old Jacobins became absolutely republican and contemptuously called the F. the 'Club Monarchique.' The club was dissolved in 1792.

Feuillet, Octave (1821-90), Fr. novelist and playwright, b. Saint-Lô in La Manche. He was intended for a diplomatic career, and was for a while cut off by his father on declaring his resolution of adopting a literary career. He contributed to the *Revue Nouvelle* and *Revue des Deux Mondes*, but made his first definite success with his novel *Bellah*, 1852, reprinted from the latter paper. This was followed by *La Petite Comtesse Dalila*, 1857, and *Le Roman d'un jeune homme pauvre*, 1858. He also wrote many comedies, which had long runs, but have not retained their popularity. His best work in fiction was done during his later years, and include *Sibylle*, 1862, his masterpiece; *Monsieur de Camors*, 1867, *Julia de Tréceur*, 1873, *La Mort*, 1886. He was elected to the Academy in 1862. See H. Bordeaux, *La Jeunesse de Feuillet*, 1922.

Feuilleton (a diminutive of Fr. *feuille*, leaf of a book), supplement of a political newspaper devoted to literary and art criticism, gossip about the fashions, epigrams, and *bons mots*. It was not usually printed on separate paper, but divided from the political part of the newspaper by a line or by smaller print. It was first adopted in the *Journal des Débats* under the editorship of Bertin, and was so popular as treated by the Abbé Geoffroy that it became a permanent feature in Fr. journalism. Later, the F. was adopted by other continental newspapers. The same kind of *causerie* may be found in Eng. papers, but the name F. is used in England exclusively to denote an instalment of a serial story.

Fever (Lat. *febris*, from *fervere*, to burn), condition of the body characterised by a temp. above the normal, and accompanied by disturbances of normal functions. The feverish condition is symptomatic of a large number of diseases, but the term is particularly applied to those morbid conditions where high temp. is the predominating symptom; that is, where the rise of temp. is practically a measure of the severity of the disease. The normal temp. of the body is between 98° and 99° F. (about 37° C.); when the temp. is above 103° F. the febrile condition (*pyrexia*) is estab.; at 106° the condition is known as *hyperpyrexia*; if the temp. rises above 107°, a fatal termination to the disease may be expected. The cause of rise of temp. may be increase of heat-production owing to stimulated oxidation or a decrease in heat-elimination owing to disturbance of the functional activity of the heat-eliminating organs, notably the skin. The greater factor is probably the latter, as in cases of F. due to the action of micro-organisms it has been found that the increase of combustion due to the struggle between the white corpuscles and the bacteria does not produce much rise of temp. On the other hand, the destructive action of the bacteria and the consequent disintegration of protoplasm are accom-

panied by a proportionate disability of the cutaneous vessels to effect adequate elimination of heat. The febrile condition is usually ushered in by shivering and alternate phases of cold and heat. Although during the cold fits the skin is clammy and the patient complains of lack of heat, the internal temp. is usually as high as in the hot fits, the sensations felt by the patient being due to nervous disturbance. The pulse is generally rapid and weak. The treatment of F. consists in the treatment of the cause. Patients with high F. should be nursed in blankets and should be given plenty of fluids. Tepid sponging, taking care to expose a small part of the body only at a time, encourages the skin to act and in this way lowers F.

Fever, Breakbone, or Dandy, see DENGUE.

Feydeau, Ernest Aimé (1821-73), Fr. author, b. Paris. His first pub. was a vol. of poetry, *Les Nationales*, 1844, but he was far more successful in writing fiction, for which he showed a genuine talent. In *Fanny*, 1858, *Sylvie*, 1861, and *Le Roman d'une jeune Mariée*, 1857, he depicts the corrupt manners of an immoral age. His other works include: *Du Luxe des Femmes*, *des Mœurs*, *de la Littérature et de la Vertu*, 1866, *Histoire générale des usages funèbres et des sépultures des peuples anciens*, 1857-61, and *L'Allemagne en 1871*, 1872, a caricature of contemporary Ger. life.

Fez, or **Faz**, sacred city of Morocco, about 85 m. S. of the Mediterranean Sea, and 100 m. E. of the Atlantic Ocean; it is picturesquely situated in the valley of the Sebu, a stream which flows through the centre of the city and falls into the Atlantic 100 m. to the W.; the valley is shaped like a pear, and surrounded by orange groves, olive plantations, and fruit orchards. The mosque of Karueen is said to be the largest in Africa and is used as a kind of univ. by over a thousand students. The mosque of Muley Edris, built nearly 1100 years ago by the reputed founder of F., is held to be so sacred that any approach by Christian or Jew is forbidden. The interior of the city is not so pleasing. The walls are decayed, and ruined buildings are to be seen on every hand. The streets are narrow and scarcely ever penetrated by the sun. Commercially, F. is one of the busiest centres of NW. Africa. The exports are olives, olive oil, citrus fruit, hides and dressed leather, and made-up silk. There is a regular caravan trade with the interior cities of Africa. The native industries are morocco leather goods, pottery, and ornamental brassware. F. was founded in 808 by Muley Edris, and it became the cap. of the W. African Muslim states. In the 10th cent. pilgrimages were made to F. instead of to Mecca. It was incorporated with Morocco in 1548. In 1911 the city was besieged by hostile tribesmen, but relieved by the Fr. gen. Lyantey. Pop. (1952) 180,000 (Europeans 15,000), but since 1952 there has been a large exodus of Europeans.

Fez, crimson skull-cap, which used to form the national head-dress of the Turks.

It was so called because the place of its sole manuf. was formerly F. in Morocco, France, Germany, and Switzerland also make F.s now. They are brimless and are ornamented with a tassel on the centre of the crown. The dye used for them is obtained from small berries which grow in profusion in the neighbourhood of F. In the 1st quarter of the 20th cent. Kemal Atatürk prohibited the wearing of the F. in Turkey as part of a campaign to modernise the country by abolishing many anct traditions which separated it from more progressive communities.

Fezzan (anct Phazania), Libya, country situated S. of Tripoli, N. Africa, and transferred to Italy with the rest of Tripolitania under the treaty of Ouchy (Oct.

He took the oasis of Kufra in 1941 and, in 1942, made frequent raids into the F. from Fort Lamy in Chad. Having thus acquired a familiarity with all the conditions of terrain and climate, he concentrated at Fort Lamy and Faya forces and supplies considerably greater than those he had used in the raids throughout 1942. By 22 Dec. (1942) his troops had penetrated the F. and routed a motorised It. detachment SE. of Gatroun. Oum-el-Araneb was attacked on the 30th and fell on 4 Jan. (1943). Gatroun was taken on 6 Jan. and with the capture of Mourzuk on the 12th the whole of the F. was conquered and Le Clerc's forces went on to take Mzda, entered Tripoli (25 Jan.), and on the next



Paul Popper

FEZ: THE GREAT MOSQUE OF KARUEEN

1912). It extends 390 m. from N. to S., and 420 m. from E. to W., and has an area of 156,000 sq. m. It consists of a desert enclosing numerous oases and bordered by low ranges of hills. The Jebel-es-Soda or Black Mts and the Haruj-el-Aswad cross the country on the N. The climate is even and healthy on the whole, as it does not lie within the tropical rain zone; rain is not frequent. Water, however, is found plentifully near the surface of the ground. There are 5 grain harvests annually; wheat, barley, melons, turnips, and cotton are cultivated, while figs, dates, olives, almonds, henna, alfa, oranges, and grapes form the chief wealth of the country. Homs (or Khoms) has for ages been the depôt for the produce of the F. The prin. tns are Murzuk, the cap. (pop. 10,000), and Sokna, Germa, Gatroun, Tejerri, etc. In the Second World War the F. was the theatre of a successful campaign organised by Gen. Le Clerc, on the orders of Gen. de Gaulle, in 1941-2 and carried out in 1943.

day took Gadamés. This remarkable campaign involved a march of 2500 km. across formidable deserts, without re-victualling, and the scaling of the Tibesti Mts. some 3000 metres in height. A Franco-Libyan Treaty of Friendship was signed on 10 Aug. 1955, under which France was to retain aircraft landing rights in F. at Ghatt, Ghadames, and Sebha. Pop. 32,000. See Capt. Paul Moynet, *Les Campagnes du Fezzan*, 1943.

Fiestiniog (place of hastening), par. and tn of Merioneth, Wales, situated about 20 m. NW. of Bala, and 8 m. from Portmadoc. It is the centre of a slate-quarrying dist. Pop. 6891.

F.F.L., abbreviation for Forces Françaises de l'Intérieur, Fr. resistance army in the Second World War. See *FRANCE—History*; and *WESTERN FRONT IN SECOND WORLD WAR*.

Ffels, see **FEIS**.

Fiacre, or Fèvre (Celtic Fiaschra), St (d. AD 670), Irish anchorite, who was allowed by the bishop of Meaux (in

France) to build a little monastery at Breuil. During life he was famed for his miracles, and his shrine in Meaux Cathedral, where his relics were transferred in 1568, is still a place of pilgrimage. The Hôtel St Flacore of Paris, which was named after him, gave its name to a kind of cab (*flacore*).

Fianna Fáil (Soldiers of Destiny), Irish political party. It was estab. in 1926 under the leadership of Eamon de Valera (q.v.), and formed at first the opposition in the Dail to the gov. party led by Wm T. Cosgrave (q.v.), which accepted the Anglo-Irish treaty of Dec. 1921. The objectives of the party included, *inter alia*, the securing of the unity and independence of Ireland as a rep., the restoration of the Irish language as the spoken language of the people, and the creation, so far as possible, of an economically self-contained and self-sufficing country. The elections of Feb. 1932 placed the F. F. party in power, and it remained in power until 1948. During this period the objectives of the party were vigorously pursued. The so-called 'Economic War' with England (caused by the refusal of the Dublin gov. to continue the payment of land annuities to the Brit. Gov.) was terminated by the London Agreement of 1938. In 1937 a new constitution was promulgated, under which the country became in all practical essentials a sovereign, independent state—the link with the Crown being retained only for certain matters within the field of external affairs. Throughout the Second World War the F. F. gov. steadfastly maintained the neutrality of the country, and repressive measures were taken against political extremists. The party was again returned to power in the general election of 1951, but was succeeded by an inter-party gov. (in which it did not take part) in 1954. In the elections of 6 Mar. 1957 the F. F. party was returned to office with a clear majority of 9 seats in the Dail. See IRELAND, REPUBLIC OF; FINE GAEL.

Fians, anglicised form of *Fiann*, or *Féinne*, of which the Eng. 'Fenians' is a variation. It is rather uncertain exactly what the F. were; what is certain is that the name is derived from Finn MacCool, or Finn MacCumail, who is the central figure of the later heroic or Ossianic cycle of Irish legend. In Scotland Finn MacCool is called Fingal. Finn was a posthumous child, and was at first called Demni. He was the leader of the F., concerning whom the general opinion is that they were a kind of militia or standing army, which was drawn from all quarters of Ireland to assist in the repulsion of enemies, particularly those from over the sea. The H.Q. of the F. was at Almu (Allen) in co. Kildare, where Finn himself usually resided with sev. contingents of his followers; the rest were posted at various places throughout the country. The adventures of the F. in war, love, and hunting are the subject of many tales and legends. The admission to this band of warriors was only gained after peculiar

and trying ceremonies of initiation. Dr Skene considers the F. to have been a distinct race, which preceded the Irish and Scottish Gaels and the Germanic people of 'Lochlan' (Scandinavia). The chief figures of the F. were Ossian, the son of Finn MacCumail, Oscar, the grandson, and Diarmait O'Duibne; the latter eloped with the destined bride of Finn, Granme, the daughter of Cormac MacArt (q.v.); the story of this is a well-known legend. The process whereby Finn became associated with the reign of Cormac MacArt is by no means clear; by the year 1000 he was so associated and has been a popular hero for more than 900 years; primarily he is regarded as one with magical powers, and as a great poet. Finn can be shown to have been originally a figure in the traditions of Leinster and Munster previous to the Viking age; it is impossible that such a band as the F. existed in the 2nd and 3rd cents., as a number of sages of much earlier date than those which state so have no mention of them. See W. F. Skene, *The Dean of Lismore's Book*, 1862, with introduction; J. F. Campbell, *Leathar na Féinne*, 1872; J. G. Campbell, *The Fians*, 1891; D. MacRitchie, *Fians, Fairies and Picts*, 1893; A. Nutt, *Ossian and the Ossianic Literature*, 1899.

Fiasco (It. word meaning 'bottle') has long been used in connection with the It. stage to draw attention to faults in either singing or acting. Perhaps the modern sense of failure is a metaphorical transference from the bursting of a bottle. The word was early borrowed by other nations of Europe, and in this country it is used indifferently of any event which comes utterly to grief.

Fiat, decree, order, or warrant of a judge, or the attorney-general, or a secretary of state, ending with *fiat ut petatur*, i.e. let it be done as is asked. For example, appeals may only lie to the House of Lords from the Court of Criminal Appeal on the F. of the attorney-general, who will only grant them if he considers a point of exceptional public importance is involved.

Fiber Zibethicus, see MUSK-RAT.

Fibich, Zdeněk (1850–1900), Czech composer, b. Schofove, studied at the Leipzig and Paris Conservatories (1865–7 and 1868–9). In 1874–8 was conductor at the National Theatre in Prague. His music is personal rather than national, and was considerably advanced and daring for its time. He wrote 7 operas and a trilogy of melodramas (spoken text accompanied by music) entitled *Hippodamia*, the most ambitious work of the kind ever produced; also some choral works, 3 symphonies and other orchestral music, melodramas with orchestra and with piano, chamber and piano music, and songs.

Fibre and **Fibrous Substances** (from Lat. *fibra*), slender filaments which compose other bodies, which may be either animal, vegetable, or mineral, and are utilised in manufs. Those used in the arts are either of animal or vegetable origin, with the

Fibrin

exception of asbestos, which is mineral. An animal F. of great importance is that of the camel, which is made into excellent cloth, while the hair of the cow makes an inferior woollen cloth. A F. of a silky quality is derived from the byssus of a large shell-fish found in the Mediterranean, and which is used for the making of shawls and gloves. The dicotyledonous plants yield the most important textile F. of vegetable origin, of which flax, hemp, reed, and jute are good examples. The most valuable is the cotton plant, consisting of hairs all round its seeds. Coir F. is obtained from the husk of the nut of the coconut palm. See also PLASTICS and MAN-MADE FIBRES.

Fibrin, protein derived from blood. F. is only a constituent of blood after it has left the arteries, being formed during the process of coagulation or clotting. F. is formed from fibrinogen by the action of the enzyme thrombin (q.v.). (See also under ENZYMES.) It reacts like other proteins, is insoluble in water, highly elastic, tough, and jelly-like.

Fibrolaine, a textile fibre made from casein, derived from waste milk, and used in the manuf. of dress fabrics, carpets, leathercloth, etc. See MAN-MADE FIBRES.

Fibula: 1. The splint-bone of the leg, being situated slightly behind and on the outer side of the tibia, or shin-bone, and extending from the knee to the ankle. It is composed of a slender 4-sided shaft and 2 larger extremities. Ligaments fastened to a roughened surface bind this bone to the tibia. The outer projection of the ankle, known as the 'external malleolus,' is a downward projection of the lower end of the F. This extremity articulates with the astragalus, and the upper or head with the upper portion of the tibia. In severe sprains of the ankle the tip of the external malleolus is sometimes fractured by the pull of the external ligaments. See also under LEG.

2. (Lat., from *figere*, to fasten), an antique clasp, buckle, or brooch. Fibulae



ANGLO-SAXON FIBULA
Silver set with garnets

or safety-pin brooches were known in the Mycenaean age, which is pre-Homeric. They are among the most common relics of prehistoric and early historic antiquity, and the study of their form and decoration is of great importance to the archaeologist. For the development of the brooch from medieval times until the present day, reference should be made to any standard work on costume and jewellery. See BROOCH.

Fichte, Immanuel Hermann von (1797-

Fichte

—, *her*, b. Jena; lectured at the Univ. of Bonn from 1823, and afterwards was ap- to a chair in Tübingen. In his *der Ethik*, 1850-3, and his *Pay-* 1864-73, etc., he tries to reconcile Herbert and Hegel. Disliking the pantheism of the latter, he was drawn rather towards the theism of Fichte.

See also Immanuel Hermann, *Die Philosophie* Immanuel Hermann von Fichte, 1928.

Fichte, Johann Gottlieb (1762-1814), Ger. philosopher of Swedish descent, b. Rammenau, Upper Lusatia. His early precocity aroused the interest of a local dignitary, Baron von Milnitz, who gave him an excellent education; and after passing through Pforta, where he read Lessing and Goethe, he entered Jena Univ. to study theology. He was now self-dependent, and the next few years found him occupied in private teaching and writing. In 1788 he became a tutor at Zurich, but this relief was short-lived, and settling at Leipzig he was compelled to turn again to literary hackwork for a livelihood. About this time he first studied Kant—an important event in his mental development, which thoroughly reversed the fatalistic tendencies shown in his early *Aphorisms on Religion*, 1780, the result of reading Wolf and Spinoza at Jena. He even commenced a 'popular version' of Kant's *Critique*, but this was left unfinished. Shortly after this, he made Kant's personal acquaintance and submitted a treatise, *A Critique of Revelation*, which Kant approved so highly that he secured its pub. in 1792; and F. was at once acclaimed as a significant philosophical force. This success enabled him, in 1793, to marry Johanna Maria Rahn, to whom he had become engaged at Zurich 3 or 4 years before; and for the next few months he remained in Switzerland, studying and developing Kantian ideas and principles. In 1794 he secured the chair of philosophy at Jena, and won immediate recognition and renown for his brilliant lectures. These early lectures formed the nucleus of the Fichtean system, and in the same year he pub. 3 vols. on the *Theory of Knowledge*. His practical philosophy was given in the *Foundations of the Laws of Nature*, 1796, and the *System of Moral Philosophy*, 1798, his most important work. Meanwhile, from 1795 to 1798 he had been joint editor of the *Philosophical Journal*, and had incidentally become the friend of Goethe, Schiller, Schelling, the Schlegels, Tieck, and Novalis. But in 1798 trouble arose through a paper pub. in that jour., and the following year F. had to resign from Jena, charged with atheism and disowned by Kant. The rest of his life was mostly passed in Berlin with the Schlegels and Schleiermacher: the chief literary results being the *Vocation of Man*, 1800, the *Exclusive Commercial State* (a socialist thesis), 1800, and *The Way to a Blessed Life*, 1806. In 1810 he was appointed rector at the new Berlin Univ.

With the exception of his lectures on transcendental logic, 1812, none of his subsequent work covers any important fresh ground; but during the struggle for national independence he earned some distinction as a patriotic lecturer, 1813. F.'s philosophy, known as subjective idealism, aimed at a complete exposition of the fundamental laws and principles which govern cognition. He contends that subject and object are absolutely identical and that the individual ego, the human mind, is non-existent apart from the absolute ego, the divine and infinite spirit of all things, God. 'Knowledge is not merely knowledge of itself, but of being, and of the One Being, God, that really is.' All realities, animate, and inanimate, are but sensuous phenomena, material expressions of their essential divine idea, and they have no separate existence, but are the product of the human soul, divinely inspired. The majority of men live in relation to the superficial appearances of things, ignorant of their divine essence; it is for the philosopher and the man of letters to discover and interpret the fundamental spiritual ideas, of which the appearance is merely a vesture. F.'s influence on philosophy and literature has been enormous; Hegelian idealism and Emersonian transcendentalism are considerably indebted to him, both for idea and for idiom of expression, whilst Schopenhauer's writings are almost wholly evolved from F.'s later works. Besides his more esoteric philosophical works, he wrote sev. of a popular cast, including *The Nature of the Scholar and The Characteristics of the Present Age*. He died during the War of Independence, having caught a fever which his wife had contracted while nursing the wounded. His collected works were pub. by his son I. H. F., 1845-6. See M. Weber, *Fichtes Sozialismus und sein Verhältnis zur Marxschen Doktrin*, 1900; G. H. Turnbull, *The Educational Theory of Fichte*, 1926; and life by E. Bergmann, 1928. See HEGEL; IDEALISM.

Fichtelgebirge (pine mts), a nat system of Bavaria (q.v.), on the Czechoslovak border; it forms the nucleus of 3 mt ranges, the Erzgebirge, Frankenwald, and Forest of Bohemia (q.v.). The highest summits are the Schneeberg, 3461 ft, and the Ochsenkopf, 3334 ft. The mts were once covered with pines. The geological formation is chiefly granite, slate, gneiss, and basalt; the minerals obtained are iron, sulphur, lead, and copper. Marble and stone are quarried, charcoal is burnt, and there are forges and blast furnaces. There are extensive tracts of forest land.

Ficksburg, tn of South Africa, in the Orange Free State, on the Caledon R. (q.v.), an agric. centre (wheat, oats, rye, potatoes, malt, fruit). F. is the centre of the 'Conquered Territory'; there are many Bushman paintings in the neighbourhood. Pop.: Whites, 3138; Bantu, 3826; Coloureds, 164.

Fiction, see NOVEL.

Fiction, Legal, some fact, state of things, or proposition assumed to be true by the

law & avowedly for the purposes of justice or convenience. F.s in law, though often ridiculous enough, have generally had their origin in some defect in the existing laws or course of procedure, and have in a measure exemplified the desire of judges or other interpreters of law to make the law, in particular cases where some change was necessary, conform to the general and progressive opinion of society. Many F.s, far from being injurious, have been highly beneficial, and have paved the way to legislative remedy. Social necessities, says Maine (*Ancient Law*), and social opinion are always in advance of law. Law is static, most societies progressive, and Maine thinks that legal F.s were historically the first agency by which law was brought into harmony with society. But in this sense of the relation of F. to the evolution of law, Maine uses the term to signify any 'assumption which conceals or affects to conceal the fact that a rule of law has undergone alteration, its letter remaining unchanged, its operation being modified.' In this wider signification the term embraces not only F.s in Eng. law and Rom. law, but the whole of Eng. case-law (Bentham's 'judge-made law'), and the Rom. *responsa prudentum* (answers or opinions of jurists of repute), as resting on a fictitious basis. It is a jurisprudential commonplace that the law is constantly and more or less imperceptibly changed by judicial decisions, although all decisions profess to do no more than apply settled principles to new facts; and similarly with the authoritative answers of the ant. Rom. jurists. A good instance of the utility of a legal F. in Rom. laws was that of adoption, which overcame the narrow caste nature of a legal *familia* by permitting the family tie to be artificially created by adoption or arrogation. Some instances of F.s in Eng. law are: the proposition that husband and wife are one; the assumptions in ancient writs for such purposes as those of *quo minus* by which the Exchequer Court (q.v.) obtained its common law jurisdiction, and *vi et armis* by which the King's Bench court usurped much of its jurisdiction (see QUEEN'S BENCH DIVISION); the suppositions involved in *fines and recoveries* (q.v.); and the assumption of the existence of the 2 legendary and much ridiculed litigants 'John Doe' and 'Richard Roe,' with the object of applying the readier process of an action of ejectment to the trial of questions relating to title to land.

Ficus, genus of Moraceae, chiefly indigenous to tropical forests, and containing species with widely diverse characteristics. *F. carica*, the fig-tree of commerce, a native of Asia Minor and Syria, is now found in a wild state in the countries bordering on the Mediterranean. The fruit of the wild variety has not the succulence of the cultivated kinds. *F. elastica* is the indiarubber tree, and is frequently cultivated in small pots; *F. religiosa*, the peplu, or sacred tree of the Brahmans and Buddhists, yields a gum resembling caoutchouc; *F. bengalensis* is the banyan, and yields an inferior rubber, the bark and

roots also furnishing a coarse rope-fibre. *F. pumila* is the climbing fig of China.

Fidei-commissum, in civil law (q.v.), denotes a trust. Scots legal writers generally refer the origin of their law of trusts and trustees to the Rom. conception of a *F.* In Rom. law a *F.* was an informal bequest or devise made to the heir or legatee (who in such a case was called the *fiduciarius*), with a request attached to it that the *fiduciarius* or trustee should deliver the property to some named person who was incapable of taking directly under the will (the *fidei-commissarius* or beneficiary). At first the rights of the beneficiary were unenforceable and could only be made good by entreaty. The Emperor Augustus, supported by the propaganda of literature and inspired by a revival of religion which led to the supplanting of secret foreign rites, estab. a system which made *F.*-commissa obligatory on the trustee, and appointed a special magistrate, the praetor *F.*-commissarius, to compel the trustee to carry out his obligations. For the most part *F.*-commissa were created by means of codicils (q.v.). Eng. legal historians, generally, are of the opinion that the lord chancellors (q.v.) borrowed the doctrine of the Eng. use (see USES) from the Rom. law of trusts.

Fidei Defensor (Lat. 'Defender of the Faith'), title conferred on Henry VIII by Pope Leo X to mark the Church's appreciation of a pamphlet which Henry had written defending the papacy against Luther's attacks on it. It was granted in 1521, and was subsequently confirmed by parliament and accorded to every Eng. sovereign since. It still appears on the coins of the realm.

Fidelity Guarantee, a form of insurance for the benefit of employers by which they are indemnified against loss through the fraud or dishonesty of their employees. The rate of premium for individual guarantees varies from 5s. per cent to as high as 40s. per cent, according to the duties of the employee concerned and the amount for which he is guaranteed. Often all the employees of a firm are guaranteed under one floating policy, in which case the names of the individual employees are not required. There is no fixed rate of premium for floating policies, as each is rated on its merits. The prin. F. G. companies are the Guarantee Society Ltd., who originated this form of insurance in 1840, Ocean Accident, Guardian, etc. See also INSURANCE.

Fidenae, anct. tn of Latium, 5 m. N. of Rome in ter. disputed in early times by the Romans and Volentes. It was destroyed by the former in 438 bc, but rebuilt on account of its strategic position. In classical times *F.* was merely a post-station.

Fidenza (Rom. *Fidentia*; later *Borgo San Donnino*), It. tn. in Emilia-Romagna (q.v.), on the Stirone, 14 m. WNW. of Parma (q.v.). It suffered severely during the Second World War, and among the buildings damaged was the beautiful cathedral (partly 12th-13th cent.). Glass

is manuf., and silk and hemp are spun. Pop. (tn) 12,200; (com.) 17,800.

Fides, goddess of fidelity. Numa Pompilius was said to have instituted her festival and built a temple to her on the Capitol. She was represented as a matron wearing a wreath of olive or laurel leaves, and carrying a basket of fruit.

Fiduciary Issue. In banking language, a *F. I.* is that part of an issue of bank notes that is not backed by gold actually held by the bank. As the word *F.* implies, it is an *I.* made on the 'faith' of people in the reputation of the bank. In this sense all bills of exchange, cheques, and promissory notes are 'fiduciary' in so far as the assets behind them are undisclosed. From the time the Bank of England lent its original capital to the nation, thus commencing the national debt, the extent of its *F. I.* has been regulated by the gov. The Bank Charter Act of 1844 fixed the *F. I.* at £14 million. During much of the 19th cent., while Britain was on the gold standard, the *F. I.* was only a very small part of the total *I.* of banknotes. In 1914 it had risen to only £18 million. In 1939, 8 years after Britain left the gold standard, the *F. I.* had risen to some £300 million, but this was still only about a third of the total *I.* of banknotes. The war and post-war financial measures revolutionised the position, and in 1956 all but £500,000 of the total note *I.* of over £1900 million was *F.* See PAPER MONEY.

Fief, or **Fee Law**, first meant an estate held in trust, on condition that the person holding it rendered personal or other service to the lord who granted it. There were 3 varieties of tenure, free, base, and religious. The first consisted in following the lord of the land to battle; the second was held in virtue of those services which more menial vassals did for their immediate superiors; and the last was held by virtue of masses said by the priests to whom the land was granted. See ENTAIL and FEUDALISM.

Field, Cyrus West (1819-92), b. Stockbridge, Massachusetts. At 15 he was a clerk in a store, and in 1840 started a paper business for himself at Westfield, in which he was so successful that he was able to retire in 1853. He became interested in a trans-Atlantic telegraph cable, and, having enlisted the sympathy of Peter Cooper and other Amer. capitalists, organised the New York, Newfoundland, and London Telegraph Company in 1854, and the Atlantic Cable Company in 1856. The cable was completed by 1858 and was hailed with delight, but it was not in proper working order until 1866. He also interested himself in the New York elevated railroad.

Field, David Dudley (1805-94), Amer. lawyer, b. Haddam, Connecticut. He took his degree at Williams College in 1825, and was admitted to the Bar in 1828. After a special study of England's legal system he worked throughout his life for the codification of the common law and procedure of America. His pamphlet on the reorganisation of the judiciary led to

his appointment as chairman of a state commission for the revision of practice and procedure, and the resultant civil code (1857) was adopted in 24 states and the criminal in 18; while the civil code of procedure was adopted in England—though not until 1873. He became head of a state commission in 1857 for the ambitious plan of reducing the whole *corpus juris* of the state into a written systematic code; but the codification was only adopted in small part, though it has often served as a model for Amer. codes. His pub. were *The Reorganisation of the Judiciary*, 1846, and *Draft Outlines of an International Code*, 1872.

Field, Eugene (1850-95), Amer. journalist and poet, b. St Louis, Missouri. He studied at Williams and Knox Colleges, and the univ. of Missouri. He wrote for various papers, but made his reputation when he became connected with the *Chicago News* in 1883. He is, however, chiefly known by his poems of childhood, among which 'Little Boy Blue' and 'Wynken, Blynken, and Nod' are favourites. His prin. works are: *A Little Book of Western Verse*, 1889; *With Trumpet and Drum*, 1892; and *Love Songs of Childhood*, 1894. See study by C. H. Dennis, 1924.

Field, Frederick (1801-85), divine, b. London, a direct descendant of Oliver Cromwell, of which fact he was very proud. He was educ. at Christ's Hospital and Trinity College, Cambridge, and became a fellow of his college in 1824. In 1839 he ed. Chrysostom's *Homilies on St Matthew*, and in 1842 he was presented by his college to the rectory of Reepham, in Norfolk. It was here he ed. Chrysostom's *Homilies on St Paul's Epistles* between 1849 and 1862. In 1863 he resigned his living and devoted his time to an ed. of the fragments of Origen's *Hexapla*, which was pub. in 1874.

Field, Sir Frederick Laurence (1871-1946), adm., b. He was in charge of the torpedo and signal schools of Portsmouth. Flag-captain of H.M.S. *King George V* and Director of Torpedoes during the First World War. Commodore and chief of staff to Adm. Madden. Third Sea Lord, 1920-3. He was deputy chief of the naval staff, 1925-7, and First Sea Lord and chief of the naval staff in succession to Adm. Madden.

Field, John (1782-1837), Irish pianist and composer, b. Dublin, was forcibly taught by his father and grandfather, and appeared at a public concert at the age of 10. After the family's removal to London he first played there in 1794 and was apprenticed to Clementi, who while teaching him, employed him at his piano warehouse to show off the instruments. In 1802 Clementi took him on a tour to Paris, Germany, and Russia, and in 1803 F. settled in St Petersburg as piano teacher and began to be very successful there and in Moscow as performer and composer. In 1832 he reappeared in London and the next year made an extensive continental tour. But he gave way to drink and sank into poverty.

After a miserable 9 months in hospital at Naples he was rescued by a Russian family, only to die in Moscow soon afterwards. He wrote 7 piano concertos, a little chamber music, 4 sonatas, and sev. pieces for piano in an individual style somewhere between Hummel and Chopin, both lyrical and brilliant; but his most important contribution are the 18 *Nocturnes*, both the manner and the title of which he originated, and which were the direct model for those of Chopin.

Field, Michael, joint pseudonym of Katharine Harris Bradley (1848-1914), b. Birmingham, and Edith Emma Cooper (1862-1913), b. Kenilworth, Warwickshire. Katharine B. was educ. at Newnham College, Cambridge, Paris, and Univ. College, Bristol. She educ. Edith C., her niece, who lived with her from the age of 4, and subsequently they worked together in such close affinity that their productions can only be regarded as if they were by a single author. Imbued with a keen sense of beauty and a fine writing touch they pub. many poetic tragedies and 8 vols. of verse. The

works, 1880, *Lucins of Adoration*, 1912, and *Mystic Trees*, 1913. *Works and Days*, 1933, contains extracts from their jour. In 1907 they both became Rom. Catholics. See M. Sturgeon, *Michael Field*, 1922.

Field, Nathan (1587-1633), actor and dramatist, b. London. One of the comedians of the Children of the Queen's Revels, he acted in plays by Ben Jonson and Chapman. He himself was the author of 2 plays, *A Woman's a Weathercock*, 1612, and *Amenitis for Ladies*, 1618, which retracts the charge. He is thought to have collaborated with Massinger in *The Fatal Dowry*, 1632, and also in some of Beaumont and Fletcher's plays. His plays were ed. by W. Perry, 1950.

Field, William Ventris, 1st Baron Field of Bakenham (1813-1907), judge. From 1830 to 1840 he was a member of a firm of solicitors, then entered the Inner Temple. Called to the Bar, 1850, appointed judge of the Queen's Bench, 1875. On supreme court rules coming into force in 1883, F. was appointed by the lord chancellor to sit in chambers continuously for nearly a year, to estab. a uniform practice. F. decided some very important cases—notably *Sharp v. Wakefield*, which laid down the principle of unfettered magisterial discretion in renewal of drink-licences.

Field, term in heraldry for the tintured ground on which armorial bearings are displayed. See HERALDRY.

'Field, The,' originated by Robert Smith Surtees and first pub. by Bradbury and Evans as a sporting weekly on 1 Jan. 1853, with Mark Lemon as editor. Leech and Hablot Browne were among early sporting artists. It took a leading part in starting dog shows and field trials, and in the development of the shot gun, and sponsored the research for a preventive for dog distemper. To-day it is an

illustrated country newspaper and authority on hunting, shooting, game preservation, fishing, racing, equestrian, polo, farming, gardening, natural hist., dogs, games, and country pursuits. Owned by the Harnsworth Press Ltd., and ed. by Wilson Stephens.

Field Artillery, see ARTILLERY.

Field-glass, instrument used for viewing objects at a distance, composed of 2 telescopes, which are identical in construction, placed parallel to one another. It is easy to use and does not strain the eyes like some telescopes, indeed it has the advantage over the telescope in that it allows the use of both eyes. It is of great value to travellers, soldiers, and sailors, and is almost universally employed by the navy in place of the long telescope used in Nelson's time. There are 2 kinds of F.s, the Galilean type and the prismatic. The Galilean, which is the ordinary F., consists of 2 lenses, an object-lens and an eye-lens; the object-lens is convex, and the eye-lens concave. It was Porro, an It. engineer, who discovered that the usual reversing lenses in a telescope could be replaced by a combination of prisms, but these could not be used until a suitable medium was found, owing to the great absorption of light. The prismatic F. was introduced in 1898, and is now in general use. Of this there are sev. varieties: the special one used by the field naturalists has extending arms which place the object glasses above the head, thus enabling the person using them to keep out of sight; the object-lenses, too, can be placed at any angle. The modern glass is made of magnalium with mountings of horn for the eye-pieces, and each eye-piece can be adjusted to suit each eye, and there must be 2 prisms in each tube. It is made in 3 different powers, magnifying 3, 6, or 12 diameters. The first is used for objects at a short distance, while the last, which does not cover such an area of view, is of great service to soldiers and naturalists.

Field-Marshal, the highest rank in the Brit. Army, was introduced by George II in 1736. Between 1736 and 1956 123 Brit. F.-M.s were created. Of these, 16 were either sovereigns or other members of the royal family, 8 were foreign sovereigns, and 1 (Marshal Foch) was a Fr. citizen.

The appointment of F.-M. rests with the sovereign and the rank may be conferred without reference to seniority. F.-M.s are presented with a baton as a symbol of office, and they remain on the active list until death. See W. C. Rundle, *The Baton*, 1950.

Field-mouse, name given to sev. species of rodents, which are allied to the ordinary mouse, the vole (q.v.), etc. *Apodemus sylvaticus*, the wood-mouse, is a great pest in fields and gardens, and hoards large quantities of grain.

Field of the Cloth of Gold, name given to the place between Guines and Ardres, France, where Henry VIII met Francis I in June 1520. Henry meant to make a great impression in Europe, and spared no pains to make the scene as magnificent as

possible. A treaty signed between the 2 kings was of little real significance.

Field-officers, in the Brit. Army, are those which rank above a captain, but below a general, viz. majors, lieutenant-colonels, and colonels. The captains, lieutenants, and sub-lieutenants are called company officers. See OFFICERS.

Field Research, see ARCHAEOLOGY.

Field Spaniel, see SPANIEL.

Fielden, John (1784-1849), politician, b. Todmorden, Lancs. As a boy he worked in his father's factory, and became M.P. for Oldham in 1833. He was a keen supporter of the Ten Hours Bill which became law in 1847. He also took an active part in the agitation for parl. reform, and was, like Cobbett (q.v.), very much against paper money.

Fieldfare, or *Turdus pilaris*, belonging to Turdidae, the thrush family, a familiar winter visitor to the Brit. Isles and central Europe. It is gregarious in habit, and finds its summer homes in the birch forests of Norway, Sweden, and Russia. The nest of the F. is of long fine grass with an intervening layer of mud; it may be built in birch or fir trees at an elevation of 15 ft., and has occasionally been seen quite near to the ground. This bird feeds on berries in hard weather, but also travels in flocks over the fields in search of slugs and other animal food. The plumage varies from ashy-grey to chestnut-brown, the underparts being a rich ochre, spotted with black.

Fielding, Anthony Vandyke Copley (1787-1855), water-colour landscape painter, was the pupil of John Varley. In 1810 he became an associate of the Water-Colour Society and contributed largely to its exhibitions. In 1813 he was a full member, and was made president in 1831. His works are clever but slight, his best pictures being sea-pieces and aerial effects. There is a collection of his drawings in the Victoria and Albert Museum, South Kensington, London.

Fielding, Henry (1707-54), novelist, b. Sharpsham Park in Somerset, son of Gen. Edmund F.; he was a second cousin of Lady Mary Wortley Montagu. Educ. at Eton, where he was contemporary with Pitt and Fox, he studied law for a short time at Leyden. He returned to London in 1728 and for some years led a dissipated life and began a long dramatic career by the pub. of *Love in Several Masques*, which was played at Drury Lane. Sev. comedies and farces followed, and his burlesque, *Tom Thumb*, 1730, is said to have evoked a laugh from Swift, who only laughed twice in his life. In 1735 F. married Charlotte Bradock and bought the little Fr. theatre in the Haymarket, where he produced *Pasquin*, 1736, and *The Historical Register*, 1737, but the Licensing Act of 1737 put an end to his career as a dramatist. After a brief experience as a theatre lessee, he studied law at the Middle Temple and was called to the Bar in 1740. Literature, however, was his main preoccupation, and in 1742 he came to the front with *The History of the Adventures of Joseph Andrews and of his*

friend Mr Abraham Adams. This was begun as a burlesque of Richardson's *Pamela*, but soon outgrew its original conception as the story developed. The chief character in the book is Parson Adams, who is a 'noble example of primitive goodness and childlike Christian altruism.' In 1743 appeared 3 vols. of F.'s *Miscellanies*, the 3rd of which contained his strange *History of the Life of the late Mr Jonathan Wild the Great*, a satirical work which places F. second to Swift in ironic power. After his wife's death he turned again to the law, but in 1745 he was once more engaged in literature as editor of the *True Patriot* and

Scott styles him 'the father of the English novel.' In both *Joseph Andrews* and *Tom Jones* F. outlined his ideas on the proper constitution of the novel, pruned of mere didacticism, but informed with a critical spirit and built on a philosophy of life. He conceives the novel as a type of epic, which, like drama, may be either tragic or comic. In associating his comic novel, *Joseph Andrews*, with the epic, it is evident that he was thinking more of the narrative form than the content of epic. There is a less remote analogy between his most typical novel, *Tom Jones*, and drama, not only in structure but in the new prominence given to dialogue—a prominence which was destined to have a most marked influence on the development of the Eng. novel. The aim of F.'s realism, unlike that of Defoe, who employs it to give readers the illusion of recorded facts, is to convey a general impression of life. Unlike the novels of Richardson, F.'s contain no emotional crises. Yet in the hist. of the evolution of the modern novel the names of F. and Richardson are inseparable. Both his and Richardson's novels differ not only from those of Defoe (who shares with both the title of 'father of the English novel') but from those of all their predecessors in one essential feature, which is best expressed in F.'s own words: 'It hath been thought a vast commendation of a painter to say his figures seem to breathe; but surely it is a much greater and nobler applause, that they appear to think.' If to Richardson we owe the note of sentiment, F. may claim to have introduced the note of humour. In analytical force and subtlety F. may be inferior to his contemporary, but his was the frother and more vigorous mind. He attempted to paint a picture of human life as he saw it, and in reproducing the broad features of town and country life in the mid-18th cent., he is unsurpassed. There are eds. of F.'s collected works by L. Stephen, 1882; G. Saintsbury, 1893; E. Gosse, 1898-9; and W. E. Henley, 1903. See Sir W. Scott, *Lives of the Novelists*, 1825; A. Dobson, *Fielding*, 1883; G. M. Godden, *Henry Fielding: a Memoir*, 1910; H. K. Banerji, *Henry Fielding, Playwright, Journalist, and Master of the Art of Fiction*, 1930; B. M. Jones, *Henry Fielding: Novelist and Magistrate*, 1933; M. P. Willcocks, *A True-Born Englishman*, 1948; E. Jenkins, *Fielding*, 1948; and F. H. Dudden, *Henry Fielding, his Life Works, and Times*, 1952.

Fielding, William Stevens (1848-1929), Canadian statesman, originally a journalist, b. Halifax, Nova Scotia. He was for 20 years connected with the *Halifax Morning Chronicle*. Entering politics, he became premier of Nova Scotia in 1884, and in 1896 was minister of finance in Laurier's gov. In this capacity he was charged with the readjustment of the Canadian tariff. He was a member of the Brit. royal commission on trade between Canada and the W. Indies, 1909-10, a governor of Dalhousie Univ., and Canadian delegate to the League of Nations Assembly, 1923; privy councillor, 1923.



HENRY FIELDING

afterwards of *The Jacobite's Journal*. In 1747 he defied convention by marrying Mary Daniel, who had been his first wife's maid and the nurse of his children, and who proved a faithful helpmeet to him. He was made a justice of the peace in the following year, and was an upright and efficient magistrate. His *Inquiry into the Increase of Robbers*, 1751, with suggested remedies, led to beneficial results. In 1749 his greatest novel, *The History of Tom Jones*, appeared; this was popular from the very first, and was praised by Hazlitt and Coleridge, and by Byron, who calls its author 'our prose Homer.' In 1752 *Amelia* was pub.; the plot of this is inferior to that of *Tom Jones*, but the descriptions and characters are very fine. He founded, conducted, and was the chief contributor to the *Covent-Garden Journal*, 1752. Journalism and his duties as a justice of the peace occupied much of his time from 1750 to 1754, when ill-health forced him to go abroad to Lisbon, where he d. and was buried. After his death his *Journal of a Voyage to Lisbon* was pub., 1755.

Fields, Grace (1898--), variety actress, b. Rochdale, Lancs. Real name Grace Stansfield. She joined a troupe when only 7 years of age, went into a cotton mill, and began as a vocalist in a Rochdale cinema, 1906. Her first London appearance was in 1915 at the old Middlesex Music Hall in a revue *Yes, I Think So*, brought from Manchester. A revue, *It's a Bargain*, with Archie Pitt (whom she married in 1923), ran for nearly 3 years. Their next revue, *Mr Tower of London*, ran for 7 years (1918-25). Appeared with Sir Gerald du Maurier in *SOS*. In 1940 she married Monty Banks (d. 1950), and in 1952 Boris Alperovici. She has entertained at 7 royal command performances, and has won great popularity, both through her burlesques and her private generosity.

Fields, William Claude (real name Dukinfield) (1879-1946), actor and comedian, b. Philadelphia, son of a London cockney whose family had emigrated to America in the late 1870's. Before coming to the cinema, F. had a long career in vaudeville and music hall. He collaborated on the scripts of a number of his films under the name of Charles Bogle. His main films were *If I Had a Million*, *It's a Gift*, *David Copperfield* (in which he played Mr Micawber), *Mississippi*, and *My Little Chickadee*.

Fieri Facias, see EXECUTION.

Fiery Cross, anct summons to arms which was used in Scotland and sent by messengers from place to place. The token was made of wood, generally in the form of a cross, which was first set on fire and then dipped in the blood of a goat. It was employed by the Highland chiefs on special occasions, especially in time of war, to summon the clan as quickly as possible. Roderick Dhu, in Scott's *Lady of the Lake*, used the F. C. to summon his clan to battle.

Fiescho, Sinnibaldo, see INNOCENT (ponces). *Innocent IV*.

Fiesole, Giovannida, see ANGELICO, FRA.

Fiesole (anct *Fassolae*), lt. tn, in Tuscany (q.v.), finely situated on a hill 3 m. NE. of Florence (q.v.). It was an important city in Etruscan (see ETRURIA) and Rom. times; from 63 to 62 BC it was the H.Q. of Catilina (q.v.). In the Middle Ages it was eclipsed by the rise of Florence. It has immense walls, a well-preserved Rom. theatre, and other antiquities include Rom. baths and Etruscan and Rom. tombs and sculptures. The cathedral is partly 11th cent. Straw goods are manuf. Pop. (tn) 5400; (com.) 12,200.

Fife, Alexander William George Duff, Duke of (1849-1913), son-in-law of King Edward VII. From 1874 to 1879 he represented Elgin and Nairnshire in parliament. He succeeded his father as 6th earl of F. in 1879, and was created duke of F. in 1889 on his marriage to the princess royal, Princess Louise Victoria Alexandra Dagmar, eldest daughter of the future Edward VII, by whom he had 2 daughters.

Fife, a maritime co. of Scotland,

'forming' a peninsula on its E. coast, between the Firths of Tay and Forth. It was originally Pictish terr., and has long been known as the 'Kingdom of Fife.' The R. Eden flows through the length of the co. into St Andrew's Bay, and waters the large and fertile valley of Stratheden and the Howe of F. immediately E. of the Lomond Hills, while the R. Leven flows from Loch Leven through the industrial area of the co. to the Forth near Levenburgh. F.'s highest hills are E. Lomond, 1417 ft, and W. Lomond, 1713 ft. Agriculture is extensively carried on, and there are valuable coal-mines; limestone, sandstone, ironstone, and shale are also worked. The prin. manuf. is linen, which is carried on at Kirkcaldy and Dunfermline, and Kirkcaldy is also famous for its oilcloth and linoleum. Brewing, tanning, ironfounding, engineering, and shipbuilding are important, and most of the coast tns take part in fishing. The chief tns are Cupar (the co. tn), Dunfermline, St Andrews (with a univ. founded in 1411), and Kirkcaldy. The burghs of Dunfermline and Kirkcaldy, and the 2 co. divs., E. F. and W. F., each send 1 member to parliament. Area 504 sq. m.; pop. 306,855.

Fife, musical instrument similar to flute, but which generally has only 1 key. It



FIFE

has a compass of about 2 octaves, and is usually pitched in Bb or C. Only simple melodies can be executed on it, and it is generally played with the drum. The army drum and F. bands were very popular. See FLAGEOLET; PICCOLO; FLUTE.

Fifth Column, term that had its origin in the Sp. Civil war, being credited to the Nationalist gen., Mola, who said, when he was beleaguering Madrid: 'I have four columns operating against Madrid and a fifth inside composed of my sympathisers.' The Germans, in the invasion of Poland, Norway, the Low Countries, and France (1939-40), had elaborated the use of F. C. activity into an essential part of the technique of invasion. By long and insidious efforts they had weaned elements of these countries to the Nazi political faith, and Nazis of Ger. descent had obtained various apparently orthodox posts in the ters. of their intended victims, so that, when the actual invasion was launched, the campaign was already half-won. Thus it is evident that the term may connote, as in the case of the Sp. Civil war, a mere supporter of one particular faction of his own fellow-countrymen, whereas, in the evolution of the Ger. technique, it meant nothing less than a traitor or spy. One of the most infamous traitors in the Second World War was Quisling (q.v.), the Norwegian betrayer of Oslo, whose name rapidly became a synonym for a F. columnist in its

worst connotation. During the invasion of the Low Countries in May 1940, the Dutch were betrayed at The Hague by Ger. civilians resident in Holland, while over a hundred Ger. and Dutch Nazis took possession of strategic points in the centre of the city. In Rotterdam the Germans succeeded, with the help of the F. C., in occupying the stock exchange in the heart of the city and the marine barracks, well in advance of the actual invasion of the city. In Belgium, the Rexist leader, Degrelle, lent the support of his party to the Germans. F. C. activities played some part in the rapid collapse of Fr. morale in June-July 1940, though the truth was that a large section of the bourgeoisie had been undermined for many years previously by quasi-Fascist tendencies, not so much through any real sympathy with their hereditary enemies, as out of a fear of the predatory intentions of the Communist elements in France. At the time of the Second World War, there seems little doubt that fear exaggerated the importance of the F. C. Most authorities have since agreed that its value was less great to the Germans than was thought at the time.

Fifth Monarchy Men, religious sect in England in the time of Cromwell, with adherents among many soldiers in the parl. army, who believed in the imminence of the millennium, or 'fifth monarchy,' during which Christ should reign on earth. They advocated a code of law based on that of Moses, and when they saw their hopes not likely to be fulfilled turned against Cromwell. Their leaders were arrested, but after the Restoration the sect again gave trouble; the insurrection of 1661 was suppressed, and Venner and 10 others were executed for high treason. Thomas Harrison (q.v.) was the most prominent of the F. M. M.

Fig (Lat. *ficus*), name given to the members of a genus of shrubs and trees of the family Moraceae. F.s are characterised by their pear-shaped receptacles which, by curving inward, form an almost perfect cavity, on the surface of which grow numerous flowers, the sterile and fertile being intermingled. They abound in tropical and sub-tropical regions, occur in about 600 species, and range in size from small trailing shrubs to huge trees, like the gigantic bo (*Ficus religiosa*) described by Emerson Tennent as growing near Anarajapooru, in Ceylon, and traditionally said to be one of the oldest trees in the world. The *F. rumphii* and the *F. religiosa* are deemed sacred by both Buddhists and Brahmins. The latter, called also the 'pepul' or 'bo,' is a large tree with heart-shaped leaves, and is cultivated in S. Asia. (See also BOTANY.) Casutobono is obtained in large quantities from the *F. elastica*, or India-rubber tree of the E. Indies—a tree remarkable for its pink buds and its great, shiny, oblong leaves, but, above all, for its gigantic roots, which group themselves snake-wise round the base. All over India the *F. benghalensis*, popularly

known as the banyan, flourishes and covers yearly an ever-increasing area with its vast canopy of foliage and branches. For each branch sends down its own root, which, growing to the surface, becomes in its turn the parent to new growths, and so both roots and branches multiply apace. The dessert fruit of commerce is grown from the *F. carica*, so called because, according to legend, the famous F. trees of Attica were originally imported from Caria in Asia Minor. In this species the leaves are deeply lobed in the cultivated tree; though often almost entire in the wild they grow alternate and are rough and deciduous. Single receptacles spring from the axils of the leaves, the numerous single-seeded pericarps being packed close



FIG

together inside. In colour the fruit varies from pale yellow to purple and bluish-black. 'Caprification' was long since introduced as an artificial aid to fertilisation. Probably the F. is indigenous only in Asia Minor and Syria, spreading thence all along the Mediterranean. Cardinal Pole introduced it into England, where on S. walls it can be cultivated with success; and in the U.S.A. it is grown profitably as far N. as Pennsylvania. The S. of France, the Sp. peninsula, and Asia Minor supply most of the F.s for Great Britain, the best kinds being shipped from Smyrna. In the warmer climates there are 2 crops, one from the buds of last summer and the other and more plentiful crop from the spring shoots, which ripen in the autumn. In S. Europe and W. Asia F.s form an important article of food, being eaten fresh and also in the form of a mashed cake, whilst medicinally they are used for chronic constipation and also for gambolia. F. wine is also brewed. Before being shipped abroad the F.s are usually dried in the sun, or in ovens, being pulled and extended by hand during the process, after which they are compressed in wooden cases.

Fig Marigold, see MISEMBRYANTHEMUM.

Figaro, famous character of dramatic fiction, who made his first appearance in *Le Barbier de Séville*, 1785, and *Le Mariage de Figaro* of Beaumarchais. The word 'figaro' seems to have meant 'wigmaker' and to have been common to Spanish and Italian. Since Beaumarchais's time F. has become the type of ingenious roguery, intrigue, and cunning, who displays the utmost sang-froid in all his daring deceptions. He appears conspicuously in Mozart's opera, *Marriage of Figaro*, and Rossini's *Barber of Seville*, 1816, and is sometimes represented as a barber, sometimes as a valet de chambre.

'**Figaro, Le.**' Fr. daily newspaper, started about 1840 by Henry de Villemessant and his colleagues. It was not until 1866 that the paper appeared daily. The first jour. with this name, which was borrowed from Mozart's well-known opera, was pub. in 1826, and was in circulation till 1833. During its short life it counted Balzac, George Sand, Paul Leconte, and Jules Janin among its contributors. After the death (1879) of Villemessant, who had given L. F. a distinctly monarchical bias, the management passed into the hands of François Magnard, Périer, and de Rodays. Its quieter tone, compared with the earlier issues, was largely due to the good offices of Magnard, who d. in 1894. Its present manager is Pierre Brisson. The paper increased its circulation to over 500,000 in 1957. Politically it is moderate right. Associated papers are *Le Figaro Littéraire*, *Le Figaro Agricole*, and *Le Figaro Sélection*.

Figéac, Aimé Louis and Jean Jacques Champollion-, see CHAMPOLLION-FIGÉAC.

Figéac, Fr. tn, cap. of an arron., in the dept of Lot, on the Célé, in a deep valley surrounded by vine-clad hills. It has many ant. buildings. Aeroplane propellers are manuf., and there is an agric. market. Pop. 6900.

Figig, or **Figig**, walled oasis, 6 sq. m., in the Sahara, 165 m. ESE. of Féz, near the frontier of Algeria in SE. Morocco, occupied by Fr. in 1893. It is an entrepôt for the Timbuktu and Mecca caravans. Pop. 15,000.

Fighter, name given to aeroplanes whose specific purpose is, strictly, the antithesis of that of the bomber (q.v.), though there are fighter-bombers, and bombers are armed to defend themselves when attacked. Primarily the function of F. planes is to stop hostile bombers, reconnaissance and photographic aircraft from flying over one's own ter.; to fly over hostile ter. as escorts, protecting home-based bombers and photographic or reconnaissance aircraft operating over enemy ter.; to attack enemy aerodromes or carry out, single-handed, specialised raids on selected targets; while, in the Second World War, another important task was that of 'tank-busting,' using rocket missiles as well as guns and bombs. Historically, guns were first fitted to aeroplanes as early as 1910, when an armed Voisin biplane was displayed at the Paris Aero Show; but

there were no true F. aircraft in service at the outbreak of the First World War. Military aircraft were expected to be useful only for reconnaissance and their pilots were armed only with a revolver for personal defence.

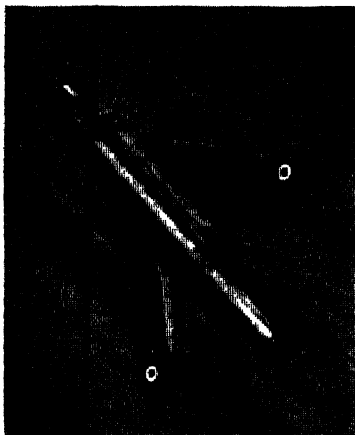
The first aeroplane designed for air fighting was the 2-seat Vickers Gunbus of 1914 which had a 'pusher' engine behind its wings and a gun position in its nose, as no way was then known of firing a gun between the blades of a 'tractor' propeller. Then the Fr. pilot, Roland Garros, fixed a machine-gun in front of the cockpit of his single-seat Morane Scout, with metal plates on the propeller blades to deflect bullets that would otherwise have damaged them. This idea was also adopted on the Brit. Sopwith Tabloid Scout and these aircraft are regarded as the first true single-seat F.s.

Garros's idea was improved upon by Anthony Fokker, whose 'interruptor' gear timed the bullets to pass between the rapidly-turning blades. Fitted to his E. II monoplane, it gave the Germans temporary air superiority in France in 1915, until the Allied air forces introduced new types such as the Sopwith Camel, D.H.2, and S.E.5.

In the 1930's Brit. aircraft builders produced the famous Hawker series of biplanes constructed with steel tubing covered with fabric. Among these were the Fury and the 2-seater Demon. The F.s of this period were officially styled 'interceptors' from the assumption that their main duty was to take to the air and intercept hostile aircraft as soon as the latter were signalled from the coast. This purely defensive function was, however, too limited, and it was not long before a strongly offensive technique was worked out, largely through the initiative of Lord Trenchard. The first Hurricane came in 1935, and almost at the same time the first Spitfire. Revolutionary changes were introduced in these famous aircraft. They marked the return to favour of monoplane designs, and the interruptor and synchronising gear were abolished, with all their weight, complexity, and liability to accident and error. The guns—8 fitted in the wings—fired clear of the airscrew. In 1918 the Lewis and Vickers guns fired at the rate of 600 rounds a min. Spitfires and Hurricanes, at the opening of the Second World War, flew at 330–365 m.p.h. and fired their 8 guns at the rate of 1200 rounds per gun per min., or 160 rounds a sec. The supreme triumph of these Brit. F.s in the Battle of Britain (q.v.) is an epic in the hist. of the nation, and was perhaps the first occasion on which the course of hist. had been changed so drastically by air power. The armament of F. aircraft was increased first by replacing machine-guns with 20 millimetre (later 30 millimetre) cannon and then by adding air-to-air rockets, air-to-ground rockets, bombs, and napalm jellied-petroleum fire-bombs. To-day there are many different classes of F. aircraft, all of them propelled by jet and/or rocket engines. They

include high-speed single-seat F.s for day interception, 2-seat twin-engined all-weather interceptors, ground-attack F.s, long-range night intruder F.s for attacking targets of opportunity in enemy-held ter., reconnaissance F.s, and other specialised categories. The fastest F. in service in 1957 is the Amer. Lockheed F-104 Star-fighter, capable of fighting at about 1400 m.p.h. It is armed with a Vulcan 20-millimetre gun which fires at the rate of 8000 r.p.m. and, like most modern F.s, has radar gun-sighting and aiming equipment.

Some of the all-weather types are flown automatically by 'homing' radar after the



'English Electric' photograph

A P.1 FIGHTER

This is powered by two Rolls Royce Avon jet engines.

pilot has brought them within a pre-determined distance of their target, by linking the radar with an automatic-pilot installation. Their guns or rocket missiles are fired automatically by the radar when within correct range. The next step, to a fully-automatic pilotless interceptor, may be only a short one. See also AEROPLANE. See C. G. Grey, *British Fighter Planes*. 1941.

Figueira da Foz, fishing port and seaside resort of Portugal, in Coimbra dist., on the Atlantic, 20 m. W. of Coimbra (q.v.). It stands at the mouth of the Mondego R., and has fish-curing, cement, and glass industries. Pop. 10,000.

Figuerras, Sp. tn in the prov. of Gerona, in the fertile plain of El Ampurdán. It has an old citadel, and was damaged in the Civil war of 1936-9. Pop. 16,200.

Figueroa, Francisco de (c. 1540-1620), Sp. poet, b. Alcalá de Henares. His comedies and pastorals reveal It. influence, and he was the first to use blank verse in Sp. poetry, modelled on the Ital-

ian. It was for his pastorals especially that his contemporary admirers gave him the ambitious title of 'Divine poet.'

Figurate Numbers, succession of series derived from any arithmetical series. The series derived from the natural numbers is obtained as in the following table:

	1, 2, 3, 4, 5, 6, etc.
1st order	1, 3, 6, 10, 15, 21
2nd order	1, 4, 10, 20, 35, 56

Here it is seen that the first order is obtained by adding 1, 2, 3, etc., terms of the natural numbers, the second order is obtained by adding 1, 2, 3, etc., terms of the first order, and so on. The numbers of the first order in the above case are called triangular, as equilateral triangles are formed with such numbers of points placed equal distances apart,

thus: . . .

etc. Square F. N. are the first order obtained from the series 1, 3, 5, 7, 9 . . . The first order is 1, 4, 9, 16 . . . and

may be represented by . . .

and so on. From the series 1, 4, 7, 10 . . . are obtained pentagonal numbers, 1, 5, 12, 22 . . .

These numbers owe their name to the fact that they may be represented by geometric figures.

Figure: 1. In geometry, a diagram drawn to illustrate a plane or solid shape.

2. In music, short phrase, especially one which assumes a distinctive character in the course of a composition by repetition or thematic use.

Figure of Speech, or **Figure of Rhetoric**, is a deviation from the ordinary use of words in order to obtain some special effect. See *separate entries under* ALLITERATION; ANACOLUTHON; ANADIPLOSIS; ANAPHORA; ANTICLIMAX; ANTITHESIS; ANTONOMASIA; APOSIOPESIS; APOSTROPHE; ASSONANCE; ASYNDETON; CHIASMUS; CLIMAX; EPIGRAM; EUPHEMISM; HENDIADYS; HOMOEOTELEUTON; HYPALLAGE; HYPERBATON; HYPERBOLE; HYSTERON PROTERON; INNUENDO; IRONY; LITOTES; MEIOSIS; METAPHOR; METONYMY; ONOMATOPOEIA; OXYMORON; PARADOX; PARALEIPSIS; PARAPROSODKIAN; PARONOMASIA; PATHETIC FALLACY; PERIPHRAISIS; PERSONIFICATION; PLEONASM; PROLEPSIS; PUN; REPETITION; RHETORICAL QUESTION; SARCASM; SIMILE; SYLLEPSIS; SYNECDOCHE; TAUTOLOGY; TMESIS; ZEUGMA.

Figured Bass, see THOROUGH-BASS.

Figurehead, figure, statue, bust, or other device attached to a ship's prow immediately under the bowsprit. Merchant vessels used to have timber volutes or scrolls in place of figures, but the fashion of F.s had largely gone out before the introduction of steamers, whose bows, therefore, were usually plain. The huge F. of the 'fighting Téméraire' and many belonging to other ancient battleships may still be seen at Millwall.

Figwort, name given to some species of *Scrophularia*, natives of Britain. *S.*

nodosa is the *F. S. scorodonia*, balm-leaved *F.*, and *S. vernalis*, yellow *F.*, all perennial herbs at one time used medicinally to alleviate the 'fig' or piles.

Fiji, Brit. Crown Colony, consisting of 322 is. between 16° and 19° S. on the 180th meridian. The cap. Suva, lies 1960 m. N.E. of Sydney (Australia) and 1317 m. N. of Auckland (New Zealand). 106 of the is. are inhabited. The total land area of the colony is 7083 sq. m., the main is. being Viti Levu (4010 sq. m.), Vanua Levu (2137 sq. m.), Taveuni (167 sq. m.), and Kadavu (157 sq. m.). Temps. are seldom below 60° or above 90°. Average rainfall varies from 120 in. per year on the windward side of the is. to 60 in. on the leeward, with the result that there is marked variation from dense forest in wet zones to grass and scrub in 'dry' zones. Rain falls all the year round, but is generally heavier between Nov. and April.

Although Sp. navigators may have visited *F.* earlier, the usual date for the W. discovery of the group is put at 1643, when Abel Tasman (q.v.) happened upon some of the N. is. Capt. James Cook (q.v.) discovered some of the small S. is. in 1774; Capt. Bligh (q.v.) in the launch of the *Bounty* passed through the main group in 1789; Capt. Wilson of the missionary ship *Duff* visited the N. is. in 1797. A Russian commander, Fabian von Billingshanser, discovered the Ono-i-Lau archipelago in 1820. In 1827 and 1838 D'Urville (q.v.) made the first comprehensive chart of the group, but it was inaccurate. Two years after D'Urville's second visit, Commander Wilkes of the United States Exploring Expedition made the first reliable chart.

In the meantime traders, attracted by sandalwood and *bêche-de-mer*, had started to come to the group from Australia. A few Europeans settled and won the favour of the chiefs, mainly by virtue of their possession of firearms and their ability to use them. The 2 best-known characters of this period were a Swede named Charlie Savage, who gained importance in Bau, and an Irishman, Paddy Connell, who was in favour in Rewa. *F.* was divided into a number of chiefly domains of varying strength and status, with most of the lesser chiefs owing allegiance to one or the other of the 2 leading chiefs—Cakobau, whose H.Q. were on the small is. of Bau, not far from Suva, and Maafu, a Tongan chief, whose H.Q. were at Lomaloma in the Lau group. Cakobau held sway over most of Viti Levu and Maafu over Lau, Taveuni, and much of Vanua Levu. The hist. of the period is one of intrigue and petty wars between tribal groups, with Cakobau and Maafu each trying to maintain his area of influence rather than either coming into direct conflict with the other.

European traders began to settle in Lau—at Lomaloma and Lakeba—in the 1830's. The first Christian missionaries, Tahitians of the London Missionary Society, settled in Lakeba from Tonga in 1830 and were already at Oneta when

the Rev. David Cargill and the Rev. Wm Cross, of the Brit. Wesleyan Society, arrived in 1835. European settlement of Levuka, on the is. of Ovalau, also began in the early 1830's, and by 1861 there were 166 adult Europeans in *F.* Interest was growing in the group as a cotton-producing country.

In 1858 Cakobau offered the group to Britain in return for meeting a claim lodged against him by the U.S.A. for 29000. Britain, beset by the Maori wars in New Zealand, declined the offer. A subsequent offer to the U.S.A. drew no reply as America was in the midst of a civil war. Nor was Germany interested when asked to accord protection in 1872.

In the meantime, after 10 years of failure, Cakobau had succeeded in establishing a Fijian parliament in 1871. Most of the power was in the hands of a few Europeans. With Fijians disunited and Cakobau far from estab. as undisputed 'king' of the group, with the Europeans divided into conflicting groups, and with the general lack of administrative experience and ability, it is not surprising that the parl. system broke down. Finally, after some years of agitation both in Australia and in England, Britain accepted sovereignty of the is. in 1874. Levuka became the cap. of the new colony and remained so until 1882 when the seat of gov. was transferred to Suva.

The pop. of *F.* at the census of 1956 was 345,737, of whom 169,403 were Indians, 148,134 Fijians, 7810 part-Europeans, 6402 Europeans, 4422 Rotumans, and 4155 Chinese, most of the remainder being other Pacific islanders. Indian immigration began as indentured labour for the sugar industry. When indenture ended, many Indians remained as independent small farmers. To-day, Indians are also active in industry, commerce, public service, and the professions. Fijians mainly engage in agriculture on communal lands, but are increasingly taking gov. and private employment.

Chief exports are sugar (£8,264,000 in 1955); copra products (£2,971,000); gold and silver (£1,031,000); bananas (£376,690). The total value of exports in 1955 was £12,761,000. A new industry is manganese mining, exports of which in 1956 were expected to total £250,000. Imports totalled £14,373,000 during the year 1955. Prin. imports are food (£2,827,000 in 1955); manufactured goods, including textiles (£3,945,000); transport equipment (£2,591,000); fuel oil and lubricants (£1,346,000). Trade is mainly with the U.K. (37 per cent), Australia (17 per cent), New Zealand (12 per cent), and Canada (9 per cent). Trade with other parts of the Commonwealth totals 10 per cent. The tourist industry is estimated to earn £500,000 a year. (All the above figures are in *F.* currency: £F111 = £100 sterling.)

F. is administered by a Governor appointed by the Crown, assisted by an Executive Council and a Legislative Council. The Legislative Council consists of the Governor, a Speaker, the

Colonial Secretary, the Attorney-General, the Financial Secretary, 13 official members, and 15 unofficial members. Of the unofficial members 3 Europeans are elected and 2 nominated, 3 Indians are elected and 2 nominated, and 5 Fijians are selected by the Governor from a panel submitted by the Council of Chiefs. The Executive Council consists of the Governor as chairman, 3 *ex-officio* members—the Colonial Secretary, the Attorney-General, and the Financial Secretary—and other members appointed by the Queen or by the Governor on the instruc-

Tonga, Cook Is., Niue Is., Gilbert Is. (q.v.). From Suva flying-boats provide fortnightly connections with Samoa, Cook Is., and Tahiti (q.v.), and regular but less frequent flights to Nadi. Nadi is linked by road and aeroplane with the international airport at Nadi (NW. Viti Levu). Nadi is on the regular air route between N. America and New Zealand and Australia. A coastal road runs 317 m. around the main is. of Viti Levu, and there are a further 350 m. of all-weather roads in the colony. Communications between the is. of F. are by small ship or by



Public Relations Office, Suva: Fiji official photograph
SUVA, FIJI

tion of the Queen acting on the advice of the Secretary of State for the Colonies.

In July 1948 it was announced that before deciding whom he would recommend to the Crown to fill 3 of the seats on the Executive Council, the Governor would ask the official European, Indian, and Fijian groups of the Legislative Council each to nominate one of their own number as a suitable candidate to be considered for appointment to the Executive Council. It was emphasised that this procedure did not confer an absolute right of choice on the unofficial members of the Legislature. The discretion vested in the Governor to submit to the Secretary of State the names of persons he considered fit for appointment to the Executive Council remained unimpaired.

The seat of gov., chief port, and commercial and light industrial centre is Suva (q.v.). There is good communication with the U.S.A., Canada, Australia, and New Zealand, and there are shipping links with other S. Pacific is.—Samoa,

Fiji Airways, which links Suva with Nadi, with Labassa and Savusavu on Vanua Levu, and with Taveuni.

There are 1 daily newspaper (Eng. language) and 5 weekly newspapers (in Eng., Fijian, or Hindustani). Broadcasting was carried on in the colony by the Fiji Broadcasting Company Ltd., a subsidiary of Amalgamated Wireless (Australasia) Ltd., from 1935 until July 1954, when the F. Broadcasting Commission took over the service. The F. Broadcasting Commission is a statutory body appointed by the Governor. The chairman and the majority of members are not gov. officials. F. was the first colony to give control of broadcasting to an independent commission of this type. The commission is financed from a gov. grant and from advertising revenue. It operates from 4 stations and broadcasts in 3 languages—Eng., Hindustani, and Fijian.

Education is not compulsory, except that Fijian children from 6 to 14 years

must attend school if there is one within a distance of 3 m. In 1955 there were 510 schools, of which 37 were gov., 246 Fijian dist. schools, 125 Indian committee schools, and the remainder mainly mission schools. In 1955, 60,223 children were attending primary schools and 2462 secondary schools. Four craft centres are maintained by the gov., which also runs a teachers' training college. The Central Medical School, which is the responsibility of the Medical Dept, provides a 5-year course for assistant medical practitioners and a 4-year course for assistant dental practitioners. Students are taken from Pacific is. as far away as New Guinea (q.v.), as well as from F. The Agriculture Dept has maintained a farm institute since 1954. A 2-year agric. course is provided.

There is no univ. in F.—students seeking further education attend Australian and New Zealand univs., while a smaller number go to England, India, or the U.S.A.

See R. A. Derrick, *The History of Fiji*, vol. 1, 1946; G. K. Roth, *Fijian Way of Life*, 1954; and *Colonial Reports: Fiji* (H.M.S.O., annually).

Filadelfia, lt. tn. in Calabria (q.v.), 13 m. SW. of Catanzaro (q.v.). Pop. 6000.

Filament, in botany, is the stalk of the stamen, at the apex of which is borne the anther or pollen case. F. is also used to describe a combination of cells which are connected only by their contiguous ends, as in many algae, hairs, etc.

Filangieri, Gaetano (1752–88), Neapolitan jurist and writer, a barrister of note and a leader of the Liberal cause. For 1 year before his death he acted as financial minister to Ferdinand IV, but his *Science of Legislation*, 1780–5, is his title to fame. In this work he discusses the principles of justice both in theory and practice in such a way as to prove himself an historian of learning and true philosophical insight. The influence of the *Contrat Social* is traceable throughout.

Filariasis, diseased condition due to the presence of the parasite *Filaria sanguinis hominis*, or allied forms. The adult *Filaria* was discovered by Bancroft of Brisbane, and its embryo was discovered in the blood by Dr Timothy Lewis. The embryo is known as *microfilaria sanguinis hominis nocturna*; it inhabits the lymphatic vessels and makes its appearance in great numbers in the blood at night-time. They are about .35 mm. long. Other species are *microfilaria perstans*, which is found in the blood both day and night, and *microfilaria diurna*, which is found in the peripheral circulation only in the day-time. The larvae inhabit certain species of mosquitoes (q.v.). The larvae are sucked from the blood by the mosquito and enter the stomach. They afterwards make their way to the base of the piercing apparatus, so that they can once more enter the body of a man when the mosquito bites. It has been observed that the blood of men may contain swarms of these parasites without any symptoms of disease being apparent.

Under certain circumstances, however, they lead to inflammation and blocking of the lymphatics and a general disturbance of their function. The characteristic symptom of F. is the appearance of chyle in the urine, and at a later stage of the disease there is a gross enlargement of the legs, and sometimes arms too, as a result of obstruction of the lymph flow. This condition is known as elephantiasis. The anti-malarial drugs are to a certain extent effective against the *filaria*. Chyle is the product of the digestion of fat; it is a liquid of milky appearance owing to the presence of small globules of fat, and under ordinary circumstances makes its way to the thoracic duct, ultimately appearing in the blood stream, where it undergoes combustion or is stored up as adipose tissue. When the lymphatics are obstructed by masses of *filaria*, the chyle is diverted from its normal course, and appears in great quantity in the urine.

Filberts are the fruit of the cultivated *Corylus maxima*; they are oval, elongated nuts that have a mild, oily taste, which makes them pleasant food. In England they are extensively grown in Kent. See COB-NUTS.

Fildes, Sir Luke (1844–1927), painter, b. Liverpool, son of Jas. F. of Chester. Studied art at the S. Kensington and Royal Academy schools. He began his artistic life as an illustrator, became a popular contributor to the *Cornhill* and *Graphic*, and illustrated Dickens's last novel, *Edwin Drood*. He was noted for the 'social realism' of his 'Casual Ward', 1874, and for 'The Doctor' (Tate Gallery) 1891, but later painted summer pictures of Venetian life. In 1902 he painted a portrait of King Edward VII, and in 1912 of King George V. He became R.A. in 1887, and was knighted in 1906; K.C.V.O., 1918.

File: 1. (from Lat. *filum*, a thread, through Fr. *fil*). Used in the military sense as the opposite of a 'rank,' that is to say, it refers to an alignment from front to rear, one man being behind another, whilst 'rank' is an alignment abreast or from right to left. Three men now form a F., the F.s being 'doubled' or 'trebled' if a denser formation is required: the number has been gradually reduced from 16, as it was in 1600. The 'rank and F.' of a regiment properly includes non-commissioned officers and men.

2. Steel implement, with teeth or serratures on its surface, much used for abrading and shaping metals and other hard surfaces. The art of filing is known to most savage tribes, hard stone- or fishes' teeth being generally employed. Single-cut F.s, which are suitable for soft metals, have only 1 set of parallel ridges, whilst double-cut F.s have 2 courses or series of chisel cuts, the second, which is usually finer, being at an angle with the first. In shape they are various: 'flat' F.s have a rectangle for their section; 'rat-tail' F.s, a circle frequently tapered; 3-square F.s, an equiangular triangle. Most are 'bellied,' that is thicker in the

centre, and in length they vary from $\frac{1}{2}$ in. (a watchmaker's) to over 3 ft (engineer's). Blanks are forged from bars of the best crucible steel and after being annealed and straightened are cut either by hand or by machine. The teeth are incised by a small stout chisel inclined at an angle of about 13 degrees from the perpendicular, the chisel being hit sharply for each cut by a hammer. A skilled craftsman can strike as many as 80 blows an hr. The hardening and tempering of a F. is a delicate operation, as excess of heat renders the steel brittle, and too little causes the teeth to wear down very rapidly, whilst hasty cooling often warps the metal and so spoils the tool. The chief difficulty in the way of making thoroughly reliable machinery for F.-cutting is that of adjusting the force of the blow to the hardness of the steel. Single-cut and double-cut F.s are graded according to the number of cuts per in., varying from 14 to 100 or more. The grades, from rough to fine, are known as rough (always single-cut), coarse, bastard, second-cut, smooth, and dead-smooth (always double-cut). The tang or tapered end provided for fitting into a handle is not included in describing the length of a F.

File-fish, *see* BALISTES.

Filicfo, Francesco (1398-1481), It. humanist, b. Tolentino, and educ. at Padua. He taught Lat. and Greek at Bologna from 1427, from 1440 at Milan—where duke Filippo Visconti became his patron. To the honour of whose successor, Francesco Sforza, F. dedicated an epic, the *Sforziad*. He went to Rome in 1475, and became prof. of Greek at Florence, 1481.

Filley, fishing tn and fashionable summer resort of E. Riding, Yorks, situated 8 m. SE. of Scarborough. There are cliff gardens, and clean golden sands. F. contains the remains of a Rom. harbour, which proves it to have been a Rom. station of some importance. There is a 12th-cent. Norman church. Pop. 4764.

Filibusters (probably a Sp. form of our word 'freebooter,' derived from Dutch *vrijbutter*) are pirates and, in general, adventurers who practise illegal warfare for their ends. Thus the Amer. adventurers who took part in the revolutions of Sp. S. America, with the purpose of increasing the anarchy to their own profit, were popularly called F.s, and in the U.S.A. the expression is frequently used of politicians whose one purpose is obstruction. Again, the expeditions sent into Spain against the Republicans by Mussolini and Hitler during the Civil war were frequently and accurately described as filibustering expeditions. In England the word F. is also applied to a small fast-sailing ship. *See also* BUCCANERS.

Filicini, Vincenzo da (1642-1707), It. lyrical poet, who came of a noble Florentine family. He became famous on account of a series of odes written in commemoration of the victories of Sobieski. He is also noteworthy for the few very beautiful sonnets he wrote, the most famous of which was *Italia, Italia, O tu*

cui feo in sorte. There is a trans. by Borrow in his *Wild Wales*. In 1864 a new ed. of his *Poesie e Lettere* was pub. *See* G. Caponi, *Vincenzo da Filicini e le sue opere*, 1901.

Filicudi, *see* LIPARI ISLANDS.

Filigree (from Lat. *filum*, a thread, and *granum*, a grain), delicate jewel and ornamental work made of twisted gold or silver wire. The metal threads are finely interlaced, solder being used to strengthen the points of union, and are wrought into intricate volutes and spirals. In the 'Tara' brooch (*see* BROOCH) and other Irish work of the 10th and 11th cents., however, the design is skilfully contrived by a single long thread. To-day the best F. work comes from the United and Central Provs. of India, where the art has been practised from time immemorial, from Malta and from Scandinavia, where the daintiest silver buttons and brooches are fashioned, with a further decoration of tiny chains and pendants. F. patterns were often built on to a solid metal ground; in the Middle Ages the Moors of Spain used in this way to embellish croziers and reliquaries. Up to the 12th cent. Byzantine goldsmiths lavished a great deal of artistic skill on F. work, and a few illustrations of their handiwork show that the art was well-known both to the Etruscans and the Celts. The Victoria and Albert Museum has a variety of examples of F.

Filioque Controversy, controversy on whether the Holy Spirit proceeded from the Father and the Son (*filioque*), or from the Father only, but through the Son. The addition of the words to the Nicene Creed in Lat. was a major cause of the Great Schism between E. and W. in 1024, the W. Church maintaining the former and the E. the latter point of view.

Filipepi, Alessandro di Mariano del, *see* BOTTICELLI, SANDRO.

Filipino, a native of the Philippine Is., and, more particularly, a member of the Christianised races of Malay stock, generally with an admixture of Sp. blood.

Filippi, Cav. Filippode, *see* DE FILIPPI.

Fillan, St, name of 2 distinct holy men of Scotland, whose feasts are celebrated on 20 June and 9 Jan. The 'June' St F. is the older of the two. He was called 'an Iobar,' the leper, and a church was dedicated to him at Loch Earn in Perthshire. The other was of Irish origin, being the son of Feredach of Munster and St Kentigerna. He d. at Strathfillan in 777, and here as early as 800 an Augustinian priory was built in his honour. Within its grounds was the 'pool of Fillan,' whose waters accomplished miracles of healing. Two relics of this saint, the Quirich and a bell, are preserved in the Antiquarian Museum of Edinburgh.

Fillet (from Lat. *filum*, a thread), architectural term, applied to the narrow ribbon-like bands, so common both in Classical and Gothic architecture, separating mouldings one from the other; also between the flutings of Classical columns. A F. may also be any narrow strip of wood.

Fillmore, Millard (1800-74), 13th president of the U.S.A., rose, like many others who have held that office, by the sheer force of his own high abilities and sterling moral character, and might with justice have said that he was handicapped rather than assisted by the accident of birth. In 1820 he broke away from his apprenticeship to a dyer, and having studied in Buffalo was called to the Bar in 1823, and prospered in his law practice. Having served in the state legislature of New York (1829-31) he next sat in Congress for 8 years between 1833 and 1843. From 1850 to 1853 he held the chief magistracy, succeeding President Zachary Taylor upon the latter's death, the office coming to him as the elected vice-president. In policy he allied himself with the Whigs, supported measures framed to mitigate the evils of slavery, advocated protective tariffs, and in 1851 tried to prevent the invasion of Cuba, which the 'filibusters' urged. His active support of the Fugitive Slave Law endangered his popularity.

Film Institute, British. Founded in 1933 and reconstituted in 1948 with an ann. grant from the Treasury, the B. F. I. is a semi-official body charged with 'the development of the art of the film, the promotion of its use as a record of contemporary life and manners, and the fostering of public appreciation and study of it from these points of view.' In effect, therefore, the I. acts for the film in the same way as the Arts Council of Great Britain (q.v.) does for music, drama, and painting. The I.'s main achievements so far have been the foundation of the National Film Archives in which millions of ft of film of priceless historical value are being preserved for posterity; the creation of the first National Film Theatre in the world; the estab. of an information service on the cinema which is second to none; and the encouragement of the film society movement for the study of film at home and throughout the Commonwealth. The I. also issues a number of periodicals dealing with various aspects of the film, and has sponsored the pub. of the first authoritative hist. of the Brit. cinema.

Film-setting, or Photo-composing, is a method preparatory to making printing plates without using type. The general scheme is to place transparent letters on an opaque substance, mount them on a carrier, and automatically bring the desired letter into line with a light beam, which transfers the image to a sensitised film or paper. The first proposal was that of G. P. Drummond of Ontario, who was granted a U.S.A. patent in 1877. Since that date over 50 schemes have been proposed, most of them failing to mature. Among the few in recent years which gave promise of success were the August-Hunter and the Uher-type; lack of capital in the former case and war conditions in the latter stopped development. The Uher-type was the first of its kind to be installed in Great Britain—at Waterlow's Durable works in 1937. There are 7 machines on the market.

Rutherford (Sun Chemical Corporation, New York) is used mainly for the credit lines of cinema films; it does not compete with ordinary printing methods. **Photosetter** (Intertype Corporation, Brooklyn, New York) is based on the Intertype mechanical composing machine (see TYPE-CASTING AND TYPE-SETTING MACHINES). Letters are inserted in the matrices and after assembly are moved one at a time in front of a camera, which takes the place of the casting apparatus. Justification is by ordinary space-bands or, alternatively, by letter-spacing the whole line. Sev. machines have been installed in Great Britain, the first in Glasgow in 1956, and a comparatively large number in the U.S.A. **Linofilm** (Mergenthaler Linotype Company, Brooklyn, New York) is a 2-unit machine: a perforator and a photographic unit. The keyboard unit, comprising an electric typewriter, a computer, and a tape perforator, produces a typed page for proof-reading and a punched tape to be fed into the photographic unit. This tape bears in code the original copy, all type-face specifications, and instructions for justification. Justification is automatic, space distribution being between words. Means are available, however, not only to letter-space but also to subtract from the normal white space between such letters as capitals AW, giving a better fit. The making up of galleys into 'originals' for plate-making is performed by an optical device which employs a working surface the same size as a full newspaper page. This device can enlarge or reduce photo-set matter in the range of 4 to 108 points and can place single lines or blocks of lines on sensitised film or paper exactly as specified in a layout of up to 96 picas wide and of any depth. **Hudego** (Dr H. J. A. de Goel, Haarlem, Netherlands) sets the matrices by hand, placing them in a 'stick' which slides into the machine. The movement of levers automatically switches on the light and photographs the line on to film by surface reflection. Type sizes can be varied from 4 to 115 points, using 2 sizes of matrix. The machine is used mainly for display work, a number of them being in commercial use. **Monophoto** (Monotype Corporation Ltd., London) has the Monotype casting machine (see TYPE-CASTING AND TYPE-SETTING MACHINES) as its basis. The copy is set on an ordinary Monotype keyboard, the perforated paper being placed on the paper tower of the photographic unit, which is an adaptation of the composition caster. The alphabet frame is a replica of the die-case, its movement causing each letter to be photographed on to sensitised film. The machine is in an advanced stage. **Rotofoto** (George Westover, London) is also based on the Monotype machine. In addition to the keyboard it has line-projector and make-up units, the projector being an adaptation of the caster. Lines are produced on film in the line projector and enlarged, when corrections can be indicated, after being printed on sensitised paper. A paste-up key proof

is made and the final negative produced on the make-up unit. This latter machine is characterised by 5 spools, carrying the main film, with corrections, insertions, folios, etc., from the line projector, each piece of film being brought into operation as required. A few machines are in use commercially. *Photon* (Photon Incorporated, Cambridge, Massachusetts), formerly known as *Lumitype*, *Lithomat*, and the *H-M* machine, is a single-unit proposal. Operation of a keyboard causes the thickness and size of the letter to be coded and passed to a 'memory box.' On completion of a line, depression of a special key causes this information to be decoded and passed through the photographic unit while the next line is composed. There are several machines in commercial use in the U.S.A., more or less experimentally.

Most of these machines have their own correction units, and, except for the *Fotosetter* and the *Hadego*, they use the standard typewriter lay-out. When the film is completed it is developed and ready for the preparation of plates, usually for gravure or photolitho, but with Dowe-etched magnesium alloy plates the way seems open for using the film for letterpress work.

Filmer, Sir Robert (c. 1589-1653), writer on politics, matriculated at Trinity College, Cambridge, was knighted by Charles I, and, being an ardent Royalist, had his house pillaged by the Roundheads. In his *Patriarcha*, 1680, and other pamphlets he developed to a ludicrous extent the theory of the divine right of kings. Yet the fact that Locke (q.v.) took the trouble to expose his fallacies *seriatim* in the *Treatise on Government* shows that at the time at least his theories made a grave impression.

Films, see CENSORSHIP, FILM; CINEMATOGRAPH.

Filmy (or Transparent) Ferns are chiefly native in moist woods of the tropics, but many species are cultivated in Britain. In many forms the fronds are filamentous, and some have the appearance of Liverworts. They like much moisture, which is best given by growing them in closed cases; a cool greenhouse is sufficient, but they must be kept well guarded from the sun. They should be planted in sphagnum, peat, or fibre; ordinary soil is unsuitable. *Hymenophyllum tunbrigense*, Tunbridge F. F., and *H. wilsoni*, Wilson's F. F., are native in England; as is *Trichomanes speciosum*. *H. fuciforme* of Chile and *H. pulcherrimum* of New Zealand are beautiful greenhouse F.s, and *Septopteris superba* is also grown.

Filter. Solid matter which is suspended, but not dissolved, in a liquid may be separated again by a variety of methods. The commonest is the use of F.s, by means of which the liquid is made to flow through one or more porous substances, which will not allow the suspended matter to pass. The simplest form of F. is that used in chemical laboratories, where a circular piece of blotting paper is folded into a quadrant and

opened into a hollow conical shape. Placed in a glass funnel this fits closely to the sides, and as the liquid is poured through the precipitate collects on the paper, and can easily be removed. When liquids are dealt with which attack paper, glass wool or asbestos fibres may be used instead of paper. One simple method of accelerating filtration is to use a funnel with a long stem. Another more effective method is to employ a Buchner funnel, i.e. a porcelain funnel with a perforated base on which a filter paper is placed, and apply a vacuum to the stem. The funnel fits into a bottle with a side tube connected to a F. pump. Difficulties sometimes



Paterson Engineering Co. Ltd.
STELLAR FILTER

arise when crystallisation from the liquid takes place in the funnel stem. To avoid this double-walled funnels are used, the space between the 2 surfaces being filled with hot water. Some suspensions are of such a fine nature that the solid particles are not efficiently retained by ordinary F. paper, in which case the remedy is to use special paper with smaller pores. Even this will not suffice to F. colloidal solutions. For the ordinary purpose of filtering water for domestic use, a large number of F.s have been devised. They mainly differ in the manner of drawing the dirty water through them. It is usual to use, as the filtering substances, sand and charcoal in some form. A home-made F. is often constructed of 2 flower-pots placed one inside the other. In the lower one is placed a sponge to plug the hole, then a layer of pebbles, upon which is a layer of sand with powdered charcoal resting upon it,

and this in its turn held down by another layer of pebbles. In the upper pot is only a sponge to prevent the water flowing too fast into the F. By this means quite a pure water may be obtained. The F.s which are manufactured for use on ship-board, and by soldiers, etc., work on this principle, but are constructed so that the sediment may be removed. To enable this to be done, devices are used so that the water may be filtered as it ascends. Thus, if a F. has 4 compartments, and the water is stored in the top one, and passed by a pipe to the bottom one, then it will ascend through the middle chambers. This is the principle adopted in Leloge's F. When the stored water reaches the lowest chamber, it ascends through a porous filtering stone to the filtering chamber, from whence it still ascends through a second stone to the chamber from whence it is drawn off. The sediment can be removed from the lowest chamber by withdrawing a plug.

Another form of F. consists of a cylindrical pot containing the filtering media and with a long tube attached to it. This pot is lowered into the water, and by using the tube as a syphon (q.v.) the water is drawn up through the pot and filtered on its way. This method has been utilised for travellers and others who may have to drink from turbid sources. A porous cylindrical stone, consisting of compressed carbon, is fitted on to one end of a flexible tube, to the other end of which is attached a mouthpiece. Then the traveller, lowering the filtering end into the pond, may drink clean water direct from the turbid source. Not only does filtration remove solid matter, but it is well known that charcoal acts upon any soluble organic matter which may be present, so purifying the water. This is of great importance, as very clear water may be highly dangerous to drink on account of the presence of organic matter. The length of time that the charcoal is efficient is, therefore, of the greatest importance. For this same reason charcoal is often placed at the openings from which issue deleterious gases, and so the air is filtered, rendering it inodorous and often innocuous.

For filtering water on a large scale the methods of slow sand filtration and rapid filtration are used, particularly the latter. In slow sand filtration, the F. beds are contained in water-tight tanks with drainage channels leading from gratings in the floor. To prevent clogging, these gratings are covered with heaps of gravel and fine sand laid level over all. Water is run in slowly and percolates through, the organic matter forming a slime on the surface. The sand, which is as a rule 2 ft deep, is simply a mechanical support and collecting area for the impurities. As the bed becomes clogged another bed is brought into use, the bed cleansed by back-washing, and the surface cleared of organic matter. Filtering is allowed to proceed as slowly as possible, but the rate is contingent on the area available and the demand for water. The reduction in

organism in the case of filtering of Thames waters amounts to 97.7 per cent on the average, depending on the thickness of the sand layer and slowness of the process. In rapid filtration, mechanical pressure F.s are used.

See WATER SUPPLY; and for other processes of clarification (q.v.) see BEER; OIL; SUGAR; SYRUP; WINE, etc. See J. Don and J. Chisholm, *Modern Methods of Water Purification*, 1911; J. A. Pickard, *Filtration and Filters*, 1929.

In photography, a F. is generally used as a control device to accentuate or to limit the transmission of one or more colours of the spectrum to which the material is sensitive. Such F.s, of tinted gelatine or glass, may be placed on, near, or in the lens. As an example, a pale yellow F. will retard the transmission of blue rays and may be used to accentuate the difference between white clouds and a blue sky in distant views, outdoor portraits, or architectural studies. See also PHOTOGRAPHY.

Filurina, see FLORINA.

Fimbria, *Gaius Flavius*, Rom. soldier, an enthusiastic supporter of Marius and Cinna. In 86 BC he was sent to Asia as legate of Valerius Flaccus, whom he induced the troops to murder. He carried on war with Mithridates, but in 85 was attacked by Sulla and committed suicide.

Fin, see FINS.

Fin-backs, see FIN-WHALES.

Fin-whales, or **Rorquals**, also called **Fin-backs** or **Razor-backs**, constitute the *Balaenoptera*, a genus of Cetacea. They are characterised by their elongated shape, short and recurved backfin, and a number of longitudinal folds in the skin of the throat. The F. are the most widely distributed of all whales, being known in all but the extreme Arctic and Antarctic seas. The blue whale, *B. musculus*, is the largest of all living animals, sometimes attaining a length of 80 or even 100 ft. *B. physalus*, the common F., grows to a length of about 60 ft, while the lesser *B. acutirostris*, attains 30 ft. These and the other whalebone whales feed on small, shrimp-like crustaceans of the plankton, these being strained from the sea by the plates of baleen hanging from the roof of the mouth.

Finale (It. word meaning 'end'), musical term, describing the concluding piece of a composition in sev. movements, such as a sonata, quartet, or symphony, also of an operatic act with a built-up final piece. It is variously handled by different musicians, usually either in sonata or rondo form, but variations or freely shaped movements also occur. The choral F. of Beethoven's 9th symphony is exceptional though no longer unique.

Finance, **National**, see BUDGET; TREASURY; PUBLIC DEBT.

Finance Acts, in Brit. administration, are formal A. of Parliament which, after the Budget (q.v.) has been introduced by the Chancellor of the Exchequer, are necessary in order to give effect to its

provisions. The first and more important of these is the F. Act, which embodies the chief alterations in methods of raising revenue. This is occasionally a very long and involved document, as the utmost precision is necessary when such methods as those relating to income tax are revised; but where the changes are few and no fundamental system is affected the F. Act may be one of the simplest and briefest for the year. The Appropriation Act, which follows, is a formal measure for voting the necessary funds to the various spending depts, and is usually supplemented at the end of the financial year by a similar measure which legalises any additional expenditure that may have become necessary. These A., as they deal chiefly with F., do not require the approval of the House of Lords. When they have been passed by the Commons they are sent to the upper chamber with the Speaker's certificate attached declaring them to be Money Bills.

'Financial News,' London morning daily paper, founded 1884, now incorporated with the *Financial Times* (q.v.).

'Financial Times,' London morning daily paper, which first appeared in 1888. With it are incorporated the *Financier* and *Bullionist* and the *Financial News*. It provides detailed news of markets, stocks and shares, and articles and news on every industrial happening and development of interest to the business man.

'Financier and Bullionist,' London morning daily paper, estab. 1866, now incorporated with the *Financial Times* (q.v.).

Finch, Heneage, 1st earl of Nottingham (1621-82), jurist, was educ. at Westminster School and Christ Church, Oxford, and later joined the Inner Temple. In 1660 he became solicitor-general, and in 1661 he entered parliament. When Shaftesbury was dismissed he was made lord keeper of the seals (1673), and next year was promoted to lord chancellor. F. was a zealous churchman; he declared in the House that gov. by bishops was inalterable, was vehemently opposed to Charles's Declaration of Indulgence (1663), and eagerly supported the Five Mile Act (1665). Burnet testifies to his forensic powers, and says that he was 'well versed in the law' but mentions also that he was ill-bred and vain. He framed for the Commons their congratulatory address to Charles on his coming to England.

Finch, name given to members of the *Fringillidae*, a family of hard-billed singing birds which inhabit the N. hemisphere. They are almost unknown in Australia. The *Fringillidae* are divided into sev. sub-families, according to the formation of the skull and beak. The *Coccothraustinae*, or grosbeaks, inhabit the Old and New Worlds, and extend as far S. as India. Their bills are fairly stout and acute, and they have bright-coloured plumage, green and yellow predominating. The species *Chloris chloris*, or common greenfinch, is often heard in gardens and small plantations. It feeds on the seed of the wild

mustard and other weeds, and has plumage of olive yellow, shading to grey. Other members of this group are *Coccothraustes coccothraustes*, or European hawfinch, and *Hedymeles virginianus*, or rose-breasted grosbeak, a handsome and sweet-voiced bird. The sub-family *Fringillinae* are distinguished by their softer bills and by their cranial differences. *Fringillae caelebs*, or common chaffinch, is a general favourite in the Brit. Isles, and may be seen nesting under the eaves of dwelling-houses. The plumage of the male is chestnut-brown, the crown and forehead black or slaty-blue, and the chin and breast pale red. The female is ashy-brown, shading to olive-yellow, the wings being pied with white. To this group also belong *Chrysomitris tristis*, or yellow-bird, a lively, graceful bird common to the U.S.A. and to Canada; also its European sister, *C. spinus*. *Carduelis cannabina*, or common linnet, is also a member of the F. tribe, and inhabits most parts of Europe, ranging eastward as far as Central Asia. *Montifringillia nivalis*, or snow-finch, and *Erythropsiza githaginea*, or desert F., are rarer and even more beautiful varieties. *Petronia domesticus*, or house sparrow and its allies, are true F.s; so are *Serinus hortulanus*, or serin F., and *S. canarius*, or familiar yellow canary. The *Pyrrhula rubicilla*, or bullfinch, is another inhab. of the Brit. Isles. A further sub-order of the F. family is the *Emberizinae*, or buntings, which inhabit the N. parts of the Old World, and some parts of India.

Finchley, municipal bor. of Middx, England, lying N. of Hampstead, a healthy and popular residential suburb of London. The manor of F. belonged to the bishops of London from very early times. At the beginning of the 19th cent. the par. contained only 1500 inhab., but it developed rapidly from the mid-19th cent. F. Common, now built over, was notorious in the 18th cent. as a resort of highwaymen, including Dick Turpin and Jack Sheppard. Hampstead Garden Suburb (q.v.) is partly in the bor. F. returns 1 member to parliament. Pop. 70,000.

Finden, William (1787-1852), engraver, who worked mainly in collaboration with his younger brother and fellow-pupil, Edward Francis F. (1791-1857). Earlier worked on book illustrations, engraving e.g. Smirke's drawings for *Don Quixote*. The F.s soon estab. a school of pupils, who worked under their direction, and indeed actually executed most of the engravings which bear their name. The elaborate finish and precision were, however, the work of the F.s. After engraving the Elgin Marbles for the Brit. Museum, and illustrating Murray's *The Arctic Voyages* and Campbell's *Poetical Works*, the F.s pub. at their own private cost in 1833 the illustrations to Moore's *Life and Works of Byron*, a work which made so great a stir that it was followed by other works of a popular nature: *Landseer's Illustrations of the Bible*, after Turner, Calcott and others; *Landscape Illustrations to the Life and Poetical*

Works of George Crabbe, 1834. But the profits they had derived from these works were squandered in a well-planned and beautifully executed but luckless venture, *The Royal Gallery of British Art*, 1838, etc. F.'s last engraving on a large scale was that of Hilton's 'Crucifixion.'

Findhorn, riv. of Inverness-shire, Scotland, flowing through Nairn and Moray to the Moray Firth.

Findlay, John Ritchie (1824-98), newspaper proprietor, b. Arbroath. He began his career in the office of the *Scotsman*, afterwards becoming owner of most of the property. He gave the Scottish National Portrait Gallery to the nation at a cost of £70,000.

Findlay, city of Ohio, U.S.A., 40 m. S. of Toledo. It manufs. machinery, rubber products, and pottery, and is the seat of F. College. Pop. 23,800.

Findon: 1. Fishing vil. of Kincardineshire, Scotland, from which F. or Finnan haddocks (Finnon Haddies) take their name. Pop. 80.

2. Vil. in the S. downs, Sussex, England. It is picturesquely situated in a vale and is not far from Cissbury Ring (q.v.).

Fine. F.s can be imposed by the courts for practically any offence other than murder or treason, though it is only since the passing of the Criminal Justice Act, 1948, that the higher courts have been able to impose F.s for felonies.

With rare exceptions only the maximum F. is fixed by law, the courts being free to impose any lesser sum. In 1955 over 93 per cent of all persons guilty of non-indictable offences were fined, and 33 per cent of those guilty of indictable offences. This latter figure is much higher than the corresponding pre-war figure. In 1938 only 18 per cent of persons guilty of indictable offences were fined. The extension of the power to F. to the higher courts is only a minor element accounting for this change, since assizes and quarter sessions were responsible for only 1700 out of a total of almost 34,700 F.s imposed. The explanation is chiefly that there has been a swing from probation to F.s largely owing to the shortage of probation staff (see PROBATION).

Before the First World War the number of persons imprisoned in default of payment of F.s averaged over 83,000 annually. A requirement that 7 days should normally be allowed for payment effected a considerable reduction, but it was not until the Money Payments (Justices Procedure) Act, 1935, was passed that the means of the offender were seriously considered in settling the amount of the F. Previously the summary courts fixed the alternative prison sentence at the same time as the F. (e.g. 20s. or a month) and in the case of non-payment committal to prison was generally automatic. Under the Act, the court can in the first instance fix only the amount of the F. If this is not paid the offender must appear again before the court and the reasons for non-payment must be investigated. Only if the circumstances, including the offender's

financial position, justify it can the court then pass a sentence of imprisonment. Time to pay, whether in a lump sum or instalments, must be allowed unless the court for any special reason direct otherwise. These requirements do not apply to the higher courts.

As a result of the Act, imprisonment in default fell from an ann. average of over 11,000 to just under 3000 in 1947. Since then there has been an upward movement and in 1953 the corresponding figure was 5100. See CRIMINAL LAW; FINES AND RECOVERIES.

Fine Arts are traditionally divided into 2 groups—the greater arts, which are sculpture, painting, architecture, poetry, and music; and a group of lesser arts, among them acting and dancing. The name F. A., with its Fr. equivalent *beaux arts*, and its It. *belle arti*, is given to these arts by reason of their fostering the love of the beautiful, although they may at the same time be useful; thus there are other minor arts which may be classed as fine if they fulfil the former condition. Among these is the work of the goldsmith, the potter, and the weaver, all of whom produce decorative as well as useful wares. Though in its widest sense the term 'Fine Arts' embraces poetry, music, dancing, and the drama, in its more usual and restricted sense it comprises only the 3 sister-arts of painting, sculpture, and architecture. 'The work of art,' according to Hegel, is 'a product of human activity and is made for man.' Its primary appeal is to his aesthetic sense; this is, indeed, its actual *raison d'être*, and the fact that it may add to his comfort or convenience, as in the case of an architectural work of art, in no way adds to its artistic importance. While philosophers do not attempt to decry the beauties of nature, they look upon them as being of a lower order than those which are classed under the heading of F. A.: for as Hegel puts it, 'the beauty of art is the beauty that is born of the mind; and by as much as the mind and its products are higher than nature and its appearances, by so much the beauty of art is higher than the beauty of nature.' Nevertheless, for various reasons, the phrase F. A. is nowadays less in use than it was, art as an expression or as a function being conceived in fundamental terms making the adjective 'fine' superfluous or inappropriate. The term has a legal aspect inasmuch as it may imply certain privileges. Thus in the court of appeal, 1955, it was adjudged that the Eng. Folk Dance Society could not claim exemption from rating, on the ground that folk dancing was not a F. A. It was remarked, however, that ballet might have had a stronger claim to that title. See AESTHETICS; ART; ARCHITECTURE; PAINTING; SCULPTURE. See also G. Baldwin Brown, *The Fine Arts*, 1916; H. Read, *The Meaning of Art*, 1951.

Fine Gael (United Ireland party), Irish political party. It was formed in Sept. 1933 by the amalgamation of Cumann na nGaedheal (the 'Cosgrave Party'), the

Centre party under the leadership of Frank McDermott and James Dillon, and the National Guard (formerly the Army Comrades' Association) under the leadership of Eoin O'Duffy (q.v.). Cumann na nGaedheal had been composed principally of the majority of the old Sinn Féin (q.v.) party which had accepted the Anglo-Irish treaty of Dec. 1921, and which had inherited the political and economic principles of Arthur Griffith and Michael Collins (qq.v.). With Wm T. Cosgrave (q.v.) as leader it carried on the gov. of the Irish Free State from 1922 until the general election of 1932, which put the Fianna Fáil party of Eamon de Valera (qq.v.) into power.

F. G. led by ex-President Cosgrave until his retirement in 1943, when he was succeeded by Gen. Richard Mulcahy was the official opposition party in the Dáil from its foundation until the general election of 1948, when it was returned with 31 seats. It then united with the other parties returned to the Dáil, excepting Fianna Fáil, to form an inter-party gov. under John A. Costello (q.v.). At the general election of 1951, F. G. increased its membership in the Dáil by one-third, but the inter-party gov. failed to retain office. In the 1954 general election F. G. was returned with 50 members, and became again the largest element in an inter-party gov. The inter-party gov. was, however, defeated at the general election of Mar. 1957, and F. G., with 40 seats, once more took over the rôle of main opposition party in the Dáil.

Finedon, vil. in Northants, England, 3½ m. from Wellingborough, in which it is now incorporated. It has boot and shoe factories, and iron-stone quarries. Pop. 4000.

Fines and Recoveries. These were fictitious or collusive actions at law, which were mainly instrumental in conveying land in spite of certain legal restrictions. Both were notoriously in use as a means of barring the entail (q.v.) of estates, thereby enabling the tenant in tail to sell the lands so as to defeat the rights of his own issue and of the remaindermen and reversioners (see *DE DONIS*; *ENTAIL*), while the common recovery was as constantly invoked to elude the Statutes of Mortmain (see *CHARITABLE USES*). A fine (*Lat. finis*, end) was formerly a common mode of transferring any freehold. Originally founded on an actual suit, it became later nothing more or less than an amicable compromise of an action, real or fictitious, whereby the lands which formed the subject of the action were acknowledged to be the right of one of the parties. It was so called because it put an end (*finis*) not only to the suit but also to all other suits concerning the same matter. The end of it was to bar issue, but not remainder or reversion, and instead of fee simple it created a 'base fee' lasting only as long as there was issue of tenant in tail, but allowing a remainderman or reversioner to come in upon the extinction of such issue. The effect of the fine was that the right of all strangers to

the suit was barred, unless claim was made within 5 years. The common recovery was an invention of the ecclesiastics designed to enable them to hold land, notwithstanding the prohibition of conveyance to a corporation. It was an action actual or (generally) fictitious, in which the lands were recovered against the tenant of the freehold, the judgment so obtained binding all persons and vesting an absolute fee simple (q.v.) in the plaintiff. In regard to estates tail the common recovery was first employed in Taltarum's historic case, and its effect was to defeat the rights not only of the issue of the tenant in tail, but of remaindermen and reversioners (q.v.) as well. Both F. and R. were abolished by the Fines and Recoveries Act, 1833. See *ENTAIL*.

Fingal, see FIANS.

Fingal's Cave, see STAFFA.

Finger-prints are reproductions of the patterns formed by the papillary ridges located on the palm side of the distal joints of the fingers and thumbs.

History.—The estab. facts of science show that the chance against one finger producing a print identical with that of another finger, whether on the same hand or on the hand of another person, is so astronomical in number that for all practical human purposes it is reasonable to conclude that such a chance will never materialise. It has been computed that theoretically 2 identical prints would be found only once during a period longer than that which astronomers estimate is needed for the sun to grow cold.

There has been much theorising on the antiquity of finger-print identification but there exists little real evidence that the science as it is known and practised to-day is other than of comparative recent origin. Some of the prints found on ancient documents and pottery are more likely to have been either a form of signature or part of a ritual; many others are merely chance impressions. Examination of a number of them show that they are simply daubs and could not be identified at any time. Three great Englishmen—Sir Wm Herschel (1833-1917), Sir Francis Galton (1822-1911), and Sir Edward Henry (1859-1931) (qq.v.)—were outstanding in their contributions to the science of finger-print identification. It was Herschel who proved that the groupings of the papillary ridges (they are formed in the first few months of foetal life) remain constant from birth to death. This he did by taking test prints at intervals, ranging over a long period, of his own fingers and those of other people. The result of these tests estab. the reliability of F. as a means of human identification. Galton did much pioneer research work, chiefly from data supplied by Herschel, but it was Henry who produced a workable system. In 1901 his system was officially adopted and the same year saw the inception of the Finger-print Bureau at Scotland Yard. Henry's system displaced Bertillon's (q.v.) anthropometric method of identification by means of bodily measurements, and its superiority soon

became manifest. The new system of the registration of habitual criminals was implemented by directions to the governors of prisons to take and forward to Scotland Yard the F. of prisoners convicted at quarter sessions and assizes and sentenced to 1 month imprisonment or more. Later the scope of registration was extended to include persons sentenced to imprisonment at lower courts for scheduled offences.

How finger-prints are taken.—For official use F. are recorded on a special form with spaces for impressions of all the digits. The spaces are numbered from 1 to 10. The prints taken in these spaces are called *rolled impressions* because they are obtained by rolling each finger from side to side on an inked plate and then repeating the same process with the inked finger during the taking of the impressions on the form. The reason for the rolling action is to obtain the largest picture possible of the area of the skin ridges which lies between the edges of the nail and the flexure of the first or distal joint of the finger, thus ensuring the inclusion of all data necessary for classification purposes. Below the rolled impressions are taken what are known as *plain impressions*. These are obtained by inking the fingers of each hand simultaneously and pressing them with the fingers held together in the spaces provided on the form. The thumbs held side by side are treated in a similar manner. The purpose of taking the plain impressions is to ensure that the rolled impressions have been taken in the correct order. A misplaced impression could result in an incorrect classification formula. After all the impressions have been taken the prisoner signs the form and immediately after the signature a print of one of his fingers is taken as a check that the prints are his.

Finger-print patterns.—F. are divided into 4 main groups of patterns, viz., arches, loops, whorls, and compounds. There are variations of each pattern.

The *arch* (Fig. 1): as the name implies, the ridges are arranged in an archlike fashion; a variation of this type is the *tented arch* (Fig. 2). The *loop* (Fig. 3) is the most common type of print. The point indicated by the arrow is called the *delta*. The ridges lying between the delta which cut a direct line to the core are counted. As the number varies in different prints it provides useful data for classification. In (Fig. 3) there are 10. The delta appears on the left side of the print. Other loops have the delta on the right side.

Whorls (Fig. 4) have a circular arrangement of the ridges. There are 2 deltas (arrowed) in all whorls—1 only in loops. Whorls are sub-divided by tracing to the right the course of the lower limb of the left-hand delta and noting whether it passes inside the right-hand delta, meets it, or drops below it (Fig. 6). The cores of some whorls are more or less elongated. *Compounds* (Fig. 5) possess features of other patterns. There are 2 deltas, and

sometimes more. They are classified in the same manner as whorls. Extra deltas lying between the 2 outer deltas are ignored.

Ridge characteristics.—When 2 prints are of the same pattern it does not follow that they originated from the same finger. Identity or non-identity is determined by comparing the order in which the ridge characteristics appear in each print. Characteristics comprise ending ridges, forking ridges, ridges forming lakes and is., etc. When the expert finds a number of these appearing in the same order in each print he knows that both prints were made by the same finger and that the remaining characteristics will coincide. Ridge characteristic data remain constant unless disturbed by a deep-seated injury that leaves a permanent scar. Superficial damage to the epidermis is more or less transient and subsequently leaves little or no trace of such injury.

Classification.—The 4 main types of pattern form a basis for the primary classification of F. For this purpose the patterns are placed in 2 categories. Whorls and compounds are given a numerical value according to the number of the digit on which they occur. Arches and loops have no value numerically. By this arrangement 1024 primary groups are arrived at. Further subdivisions are obtained by using the delta ridge tracing of whorls and compounds and by counting the ridge lines in loops (see above, *Finger-print patterns*). Many permutations result from the inter-combination of the ridge tracing and ridge counting formulas. The presence of arches and radial loops provide additional data in some sub-groups.

Filing and searching.—The place a set of prints will occupy in a collection depends firstly on the primary classification number. This may be any one of the 1024 groups referred to. Reference is then made to the secondary classification derived from the methods used for subdividing patterns. If a tertiary classification appears in the formula it must be consulted next, and finally the set of prints is arranged according to the number of ridges in loops, if they are present, on the little fingers and thumbs. If a person has been previously convicted, and providing he has given his correct name when he is again finger-printed, the location of his prints in the collection is a matter of a few min. Should he give an alias the searcher must have recourse to data existing in the prints for identification and disregard names. Selection of the appropriate file in which to search is made by following the sequence shown for filing prints.

Finger-prints left at scenes of crime.—This is the aspect of finger-print identification that appeals most to the public imagination, but it is more difficult to deal with than the phase which has been outlined. Scenes-of-crime prints are often fragmentary and lack the data and clarity of prints deliberately taken by a skilled operator. Surfaces of reasonable



FINGER-PRINT TYPES (ENLARGED)

1, arch; 2, tented arch; 3, loop; 4, whorl; 5, compound; 6, detail of ridge tracing of 4

smoothness are suitable mediums for retaining sweat prints. Some of these marks can be recorded by means of photography alone; others have to be intensified by the application of powders, and in some cases chemical agency is employed. Development of marks on cloth is limited to closely woven materials of very fine texture. Coarse cloth will not yield identifiable prints. As it would be a gigantic task to search among the vast number of prints filed in the main finger-print collection an ancillary one of single prints is maintained to expedite the identification of chance impressions. The *Single Finger-print Collection* is in effect 10 separate collections, each containing the prints of 1 digit only. Experts can often decide which finger has made a mark and this greatly reduces the number of prints to be compared. The prints for inclusion in the *single* collection are selected from those in the main collection and include those of convicted burglars, house-breakers, etc. The methods of classifying single prints are more complicated than those used for a complete set of 10 prints and require special apparatus.

General.—Regulations made under section 8 of the Penal Servitude Act, 1891, and sections 39 and 40 of the Criminal Justice Act, 1948, confer upon prison governors and police power to obtain the F. of both convicted and unconvicted persons in custody. Finger-printing for civil purposes is practised little in this country. During the late war the prints of merchant seamen were taken on their identity cards, otherwise the scope of the system is and has been very limited. On the other hand the whole of the armed forces of the U.S.A. are finger-printed, and the Federal Bureau at Washington has a huge collection of the prints of persons who, in their own interests, have volunteered them. Many other countries make extensive use of F. for civilian registration and the taking of prints of immigrants is often a condition of entry. See Sir E. Henry, *Classification and Uses of Finger-Prints*; F. R. Cherrill, *The Finger-Print System at Scotland Yard*, 1954; and *The Journal of Criminal Science*, vol. II.

F. impressions are required in the passports issued by a number of countries, but not by the U.K.

Fingers, Deformities of, see HAND.

Fingo, name given to the remnants of the Nguni (q.v.) tribes of the Cape, South Africa, after the numerous inter-tribal and border wars of the 19th cent. To-day they are settled in many small locations of the Ciskai. Many have traces of European blood.

Finial, a vertical ornamental feature, usually of stone, standing at the base or on the apex of a gable or pinnacle; much used in Gothic and Elizabethan architecture.

Finiguerra Maso, or *Tomaso* (c. 1410–1475), It. sculptor and goldsmith, b. Florence, supposed to have been taught by Lorenzo Ghiberti. He was specially skilful as an engraver on metal. His

'Coronation of the Virgin,' now in Paris, has great beauty.

Fining, see BREWING—Top Fermentation.

Finistère (from Lat. *Finis terrae*, end of the land), most W. dept of France, with an area of 2729 sq. m. It is bounded by the Eng. Channel, Atlantic Ocean, and the depts of Côtes-du-Nor and Morbihan. The coast is bold and rocky, with lofty cliffs of granite; the Pointe de Raz is the most dangerous headland. The interior has 2 chains of hills, stretching parallel from E. to W.—the Mt Arrez, and the Noires; these are clothed with forest trees and heathland, while rich meadows and fertile valleys lie between. The climate is temperate with W., NW., and SW. winds. Over a million ac. are under cultivation, and the crops are wheat, rye, barley, oats, potatoes, flax, mangold wurzel, etc.; fruit and vegetables are exported. The grass lands are very extensive, horse and cattle breeding being an important industry. The mineral wealth is not great; coal and iron, lead, bismuth, and zinc are obtained, and granite, marble, and slate are quarried. The arrons. of Brest, Châteaulin, Morlaix, and Quimper are contained in the dept. Quimper is the cap., and Brest, the largest tn, is a port and military station. The manufs. are woollens and llnens, sailcloth, rope, paper, shipbuilding, etc. Pop. 760,000.

Finisterre, Cape, Atlantic cape on the NW. coast of Spain (lat. $42^{\circ} 52' 45''$ N.; long. $9^{\circ} 15' 32''$ W.). It is in the prov. of La Coruña, is the most westerly point in Spain, and is the projection of a mt height rising to about 2000 ft above sea-level. Its lighthouse is visible from vessels 50 m. out. In a naval engagement off F. in 1747, Anson (q.v.) captured 12 Fr. men-of-war and 6 other vessels. In the same year Rear-adm. Hawke (q.v.) took 6 Fr. men-of-war, and here again, in 1805, Calderan Strahan defeated the Fr. and Spaniards.

Finite: 1. In mathematics, when in the expression $(1+x)^n$ the index n is a positive integer the series is called a *finite series*. When n is negative or fractional the number of terms is unlimited and the series is called *infinite* (q.v.).

2. In grammar, a *finite verb* is limited by person and tense and states what someone or something does, did, or will do, or what is, was, or will be done.

Finite Differences, in mathematics mean the excess of one quantity over another. This fundamental meaning of the term is almost lost in the higher parts of mathematics from the association of it with a methodised theory, the calculus of F. D., derived from the consideration of the D. presented by successive quantities which follow a regular law. By the operation of taking D. in this sense, we may find the rational integral function of the number of terms in a series or the general term of a series, when a certain number of the terms of the series are given. That is to say, the regular law of the series not being known by inspection,

we proceed to take the first order of D., viz., by subtracting each term from the term which immediately follows it and so forming a new series called the series of the first order of D.; then by repeating the process we get the series of the second order of D. and so on until a series of regular or known form is arrived at, e.g. take the series $-1, -3, 3, 23, 63, 129 \dots$ and let a^n denote the general term of the series, and n the number of terms in the series. The successive orders of D. are:

$$\begin{array}{ccccccc} & & -2 & 6 & 20 & 40 & 66 \\ & & 8 & 14 & 20 & 26 & \\ & & 6 & 6 & 6 & & \end{array}$$

That is, the third order of D. gives equal terms, and a^n , the rational integral function of n , may be assumed $= v + x^n + y^{n^2} + z^n$. Putting 1, 2, 3, 4, for n in succession, we find $v = 3, x = -3, y = -2, z = 1$, and that the general term of the series is $3 - 3n - 2n^2 + n^3$.

A practical application of the method is shown by the following example. Find the value of the co-ordinate x of the sun on Feb. 14d. 12h., 1955, from the following data taken from the *Nautical Almanac*.

Feb.	x	Δ	Δ^2	Δ^3	Δ^4
14	+0.8040992				
		+101488			
15	0.8142480		-2490		
		+98998		-35	
16	0.8241478		-2525		+4
		+96473		-31	
17	0.8337951		-2556		
		+93917			
18	0.8431868				

The values of x are deducted from the succeeding values in each row and the results are tabulated under Δ , denoting the first difference. Each value of Δ is then deducted from the succeeding value and the results are tabulated under Δ^2 , the second F. difference. The process is continued as far as the fourth difference tabulated under Δ^4 . It will be seen that the D. decrease in each column and would ultimately disappear or become so small that they would not appreciably affect the figures to the degree of accuracy that is necessary—in the present case to 7 decimal places. The next step is to adopt one of sev. formulæ which are in common use by computers, and the Gregory-Newton formula will be selected in this case. In this formula y denotes the value of x on Feb. 14d. 12h. (or 14.5) and x is the interval of time from the preceding day to the instant at which the computations are to be made—in the present case 0.5 day: $y = f(a) + x\Delta + \frac{x(x-1)\Delta^2}{2!} + \frac{x(x-1)(x-2)\Delta^3}{3!} + \frac{x(x-1)(x-2)(x-3)\Delta^4}{4!} + \dots$ Taking $x = 0.5$, the values of the coefficients of $\Delta^2, \Delta^3, \Delta^4$, are $-1/8, +1/16, -5/128$, and hence $y = 0.8040992 + \frac{1}{16} \times 0.0101488 - \frac{5}{128} \times 0.0002490 + \frac{1}{16} \times 0.000035 - \frac{5}{128} \times 0.0000004 = 0.8040992 + 0.0050744 + 0.0000311 - 0.0000002 - 0.0000001 = 0.8092045$.

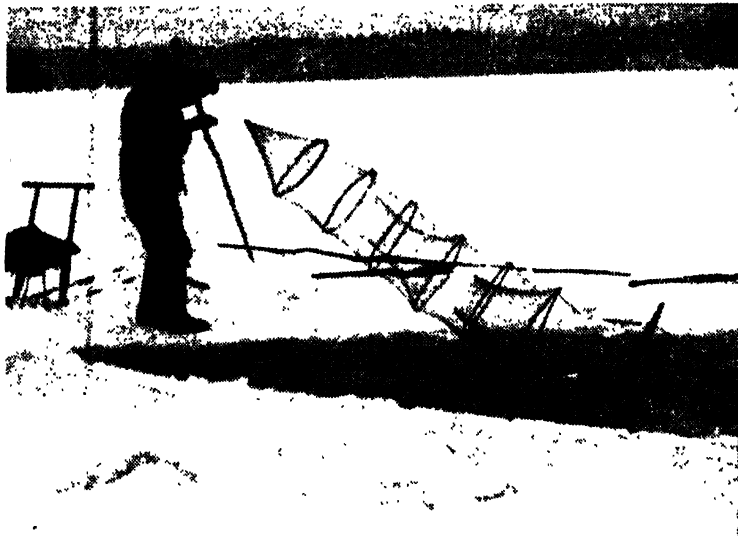
See *Interpolation and Allied Tables*, reprinted from the *Nautical Almanac* (H.M.S.O.), 1937; E. T. Whittaker and G. Robinson, *The Calculus of Observations*,

1924; G. Boole, *The Calculus of Finite Differences*, 1946.

Finland (Finnish *Suomi*, or *Suomen maa*, 'the land of fens and lakes'), rep. of N. Europe, situated between the Gulfs of Bothnia and F., and bounded on the W. by Sweden, on the N. by Norway, and on the E. by Russia. Its land area in Jan. 1945 was 117,975 sq. m. (excluding inland water area of 12,190 sq. m.). The Åhvenanmaa or Åland Archipelago (q.v.) at the entrance to the Gulf of Bothnia (area 560 sq. m.; pop. 29,000) forms part of the Finnish Rep. The coast-line of the

country is flat, the highest mt being Hallatunturi (4126 ft), in Lapland. In the S. the highest is Thirismaa (754 ft). Three-fourths of the land surface is covered with forests which yield valuable timber and raw materials for wood-working and paper industries.

MINERALS in F. are very limited. No coal is found, but some 22,000 tons of copper, 100,000 tons of pig iron, 175,000 tons of steel ingots, and a total of 180,000 tons of rolled products are obtained annually. Some gold is found on the Ivalojoiki, in Lapland, and very fine



FISHING IN WINTER, FINLAND

Finnish Embassy

country is deeply indented, like that of Sweden, and there are clusters of numerous small is. Inland there is a labyrinth of large lakes and rocky basins which are divided by low, flat hills and artificially joined by canals. The chief lakes, prior to the war with Russia, were Lake Saimaa, drained by the Vuoksen over the famous Imatra Falls into Lake Ladoga; Inari, Näsijärvi, Pyhäjärvi, Oulujärvi, and Pääjärvi; but after the war, F. lost her portion, the N. half, of Lake Ladoga, and further losses were sustained by the terms of the armistice of 1944. The prin. rivs. are Tornio, Kemi, Oulu, Teno, and Kymi. S. F. is watered by a number of short rapids, which are of use for working mills, and to some extent for internal navigation. Lake Saimaa is connected with the Gulf of F. by a sluiced canal 86 m. in length. The surface of the

granite is quarried from the Vehmaa mines. The surface of the country consists of such primitive rocks as gneiss, gabbro, and diorite. Cambrian, Silurian, and Carboniferous deposits are found along the coasts of the Gulf of F.

INDUSTRIES AND COMMUNICATIONS.—Agriculture is the chief industry of most of the pop., though only about 8 per cent of the land is cultivated. Wheat is the chief crop, but rye, barley, oats, hay, and potatoes are also grown. Butter and all kinds of dairy produce are exported in large quantities. The State encourages scientific training and provides instructors for the agric. and horticult. schools. Currants, strawberries, and raspberries are grown with great success, and the apple, pear, and cherry tree are cultivated in the S. Fishing is a prosperous industry; salmon, trout, perch, etc.

abound in the lakes and rivs., and a kind of herring is caught off the SW. coast. The manufacturing industries include paper, engineering, wood-working, textiles, chemicals, tobacco, cellulose, leather, etc. The exports are mainly the output of the paper mills, saw mills, and wood-pulp factories: sawn and planed timber, boxboards, and wood for paper-making, also hides, pitch, and dairy produce. The many lakes, connected by canals, form an important system of internal communication. The canals and waterways are navigable at a length of

The ann. rainfall at Helsinki is 20 in. and along the S. coast 25½ in. Helsinki, Turku, and Hanko are the only ports open during the winter.

EDUCATION AND GOVERNMENT.—Education in F. is very advanced. There is a univ. at Helsinki (founded in 1640 at Turku), which has over 10,000 students, 4000 being women, and 2 univs. at Turku. Helsinki has also 1 technical and 4 commercial institutes, which are accorded univ. status. There are a number of polytechnic, commercial, nautical, and agric. schools. The country is governed



Finnish Embassy

TURKU, THE ANCIENT CAPITAL AND SECOND CITY OF THE COUNTRY

about 2700 m. and floatable at a length of over 26,000 m. There are only 3000 m. of railway, all but 150 m. belonging to the State. There are 20,000 m. of high roads and 17,000 m. of other public roads. There are over 32,000 m. of State-owned telegraph wires and over 270,000 m. of telephone wires.

CLIMATE.—The climate of F. is very severe during the winter, even along the S. coast, where it varies in Jan. between 20° and 30° F. Owing to the SW. and W. winds, and to the proximity of the sea, the climate is less rigorous than it is farther E. in N. Russia. The winter lasts many months, and frosts have been known to destroy the crops as late as June. The ground is usually covered with snow from the middle of Nov. till late in April. In June, July, and Aug. the days are very long and the weather dry and sultry.

by a president, elected for 6 years, a Council of State, chosen by him, and a House of Representatives consisting of 1 chamber of 200 members. Women have been enfranchised since 1907 and are eligible for the House of Representatives. F. was thus the first country to concede women suffrage. Military service is compulsory.

POPULATION.—The pop. is 4,215,000. The bulk of the inhab. are Finns, a people of Finno-Ugric stock. The rest of the pop. is made up of Swedes, Lapps in the N., Russians, and Germans. The vast majority of the pop. is Lutheran, but there is complete religious toleration. Helsinki (formerly Helsingfors), with a pop. of 404,000 is the cap.; other important towns are Tampere (Tammerfors), 110,000; Turku (Åbo), 110,000; Porv (Björneborg), 44,000; Lahti, 44,000;

Kuopio, 37,000; Jyväskylä, 33,000; and Kotka, 28,000.

THE ARTS.—Finnish is a Finno-Ugrian tongue; and from 1883 it was placed on an equal footing with Swedish as an official language of the country; but subsequent to the creation of the Finnish Rep. after the First World War the use of Swedish declined except in the Åland Is. In literature, too, until the end of the 18th cent., Swedish was dominant, but there was a Finnish revival in the first decades of last cent., while the formation of an association for the promotion of Finnish literature in 1831 gave a new impetus to the study of the national language and to the collection and pub. of popular songs and lyrics. Many of the modern Finnish novelists and poets, writers for the most part of the naturalistic school, enjoy a European reputation. Emil Sillanpää was awarded the Nobel Prize for Literature in 1939. In music F. can claim Jean Julius Christian Sibellus (c.v.), who was b. at Hämeenlinna, 1865.

HISTORY.—The Finns are said to have settled in F. during the 8th cent., having been expelled from the banks of the Volga. Until the 12th cent. they were pagans, when they were conquered by Swedes and adopted Christianity. They remained a dependency of Sweden for 500 years, but enjoyed autonomous gov. Russia repeatedly tried to seize the country from Sweden, and in 1721 by the treaty of *Uniskaupunki* (Nystad), Peter the Great won that part of F. which forms the prov. of Viborg. In 1743, by the peace of Turku, Elizabeth extended the Russian frontier to the Kymmene. In 1809 Sweden ceded the rest of the country with the Åland Is. to Alexander I in the peace of Hamina. F. preserved its ancient constitution until 1897, when its autonomy was attacked by the Russian Gov. In 1899 Russia declared her right to legislate on Finnish affairs, regardless of the consent of the Finnish Diet, and between 1900 and 1902 the national Finnish forces were incorporated into the Russian Army, and Russian was made the official language of the senate and of the more important public depts. There was great discontent in the country, and in 1904 Bobrikov, the governor-general, was assassinated. In 1905, the Constitutionals and the Social Democrats formed a coalition and, taking advantage of trouble in St Petersburg, succeeded in winning certain concessions from the governor-general, Prince Obolenski. The popular demands included the freedom of the Press, the deposition of Russian officials, and the reorganisation of the Diet on a basis of universal suffrage. These requests were granted and a single chamber of 200 members was substituted for the old Diet of 4 chambers. Trouble was renewed in 1908 when the Russian Gov. again attempted to curtail the powers of the Finnish Diet, and in 1910 the 'Imperial Legislation Law' was passed depriving the Parliament of its right to legislate on such questions as the imposition of taxes, police direction, school management, and

the control of the Press, which, it declared, affected 'imperial interests.' In 1911 the Russian Duma passed a Bill 'placing Russians on civil equality with the Finnish citizens in the grand duchy.'

In 1917, when the Russian Empire broke down, F. declared itself independent, but Bolshevik aggression led for some time to civil strife. Order was restored and matters finally settled between F. and Russia by the treaty of Dorpat, 1920.

Finnish-Russian War, 1939-40.—In the autumn of 1939 F. was one of the small nations suddenly destined to be a pawn on the international chess-board. The extension of Soviet influence in the Baltic, following the estab. earlier in the same year of military, naval, and air bases in the 3 Baltic reps. of Estonia, Lithuania, and Latvia, offered an obvious threat to F. There were negotiations in Moscow on political and economic questions, but it was clear that Molotov, the Soviet Minister of Foreign Affairs, was presenting demands incompatible with Finnish independence. Stalin's real policy was to secure a hold on F. by way of offsetting Ger. penetration in Scandinavia, and in his attack on F. he undoubtedly showed considerable acumen in forestalling Germany's coming invasion of Norway of the following year. Soon after the Moscow negotiations had broken down, the Soviet Gov. denounced the non-aggression pact of 1932 and diplomatic relations were broken off. On 30 Nov. Soviet bombers began hostilities by attacking Helsinki and a number of other Finnish towns, including Viipuri (Viborg) and Enso. The fortress of Hanko was bombarded by Soviet warships and Petsamo seized. At the same time a so-called Finnish People's Gov. was set up at Terijoki by Kuusinen, a former secretary of the Komintern, the avowed object of this puppet gov. of the Soviet being to help the Finnish 'Democratic Republic' of revolutionary peasants and workers. This 'Winter War' was branded as an act of Soviet aggression in Dec. 1939. Although outnumbered, the Finnish forces at once offered a most determined resistance to the Russian invasion. Heavy casualties were inflicted on the Russians both in the Karelian Isthmus and to the N. of Lake Ladoga (1 Dec.). The soul of the Finnish defence was Field-Marshal Mannerheim, the 'liberator of Finland' from the Bolsheviks in 1918. The Finnish Gov., however, through the Swedish Gov., notified the Soviet of their desire to enter into fresh negotiations, but the offer was rejected. There is no doubt that, despite the bravery of the Finnish troops, the morale of the people suffered from the bombing of the towns, especially as the Finns had but few planes with which to resist or retaliate. Large numbers of Russian tanks were destroyed and heavy casualties inflicted on their infantry in the course of the gradual withdrawal of the Finns to the Mannerheim Line. The Russians then proclaimed the blockade of the Finnish coast of the Gulf of Bothnia down to

Hanko and 20 m. out to sea. Very fierce fighting occurred from 10 to 16 Dec., especially on the Karelian Isthmus and N. of Lake Ladoga and all along the E. frontier, but the Mannerheim Line held firm. The Finnish Gov. then appealed to the world for help and issued a statement setting forth the circumstances leading to the conflict. It was obvious that if the Finnish account of the Moscow negotiations were accurate, she could never have acceded to the Soviet demands, which actually included a 30-year lease of Hanko, the cession of numerous is., a port on the Karelian Isthmus, and mutual demolition of fortifications on the isthmus.

In the week 16-23 Dec., the Russians made desperate attempts by massed troop attacks to break the Mannerheim Line on the Karelian Isthmus, but were repulsed with very great losses. Heavy damage was done on 18-21 Dec. to Helsinki in numerous air raids, as many as 200 planes taking part in successive attacking waves. Once more President Kallio appealed to the world for assistance. Preparations were made in England to send a token force, but the effort was frustrated by the assurance that both Norway and Sweden would resist their passage to F. However the Finns continued to offer a staunch resistance, defeating the Russians at Aglajärvi, Salla, and elsewhere, and even crossing the Soviet frontier N. of Lake Ladoga; while in the far N. the Russians were also hurled back in retreat. Victories were also won at Lake Kianta and at Suomussalmi. The Soviet command retaliated with more bombing raids on the main Finnish towns, and these repeated raids undoubtedly told with cumulative effect on Finnish morale, although some 170 planes had been shot down. Yet a third appeal to the world was made by President Kallio, but, while there was some talk of foreign aid, only a few aeroplanes reached F., these being sent by Britain. In the penultimate week of Jan. many Soviet attacks were launched NE. of Lake Ladoga in a new effort to outflank the Mannerheim Line, but the Finns still held firm. Early in Feb., further attacks were made on the Mannerheim Line and near Lake Ladoga, the attacks making some impression at Summa, but only at great loss to the Russians. The Soviet command now brought up some of their best shock troops in a determined effort to break the stubborn resistance of their adversaries. Massed attacks were made ceaselessly, with especial violence at Summa, Muolaa, and on the Taipale R., and at length the Finns were forced to withdraw from their advanced positions (11-17 Feb.); but they inflicted some 30,000 casualties on their attackers. F. appealed in vain to the Swedish Gov. for military assistance, and by 25 Feb. the Russian offensive on the Karelian Isthmus had brought their forces close to Viipuri and compelled the Finns to evacuate the important fortress of Kovisto.

The massive Russian attacks were at last wearing down the gallant resistance of the Finns, who had now abandoned the

W. part of the Mannerheim Line, and hostilities concluded early in Mar., the peace treaty being signed in Moscow a day or two later. Under it F. ceded the Rybachi Peninsula in the N., some ter. in the N. centre, the Karelian Isthmus, and the Gulf of F. is. in the S.—including Viipuri, Viipuri Bay, and shores of Lake Ladoga and a 30 years' lease of the port of Hanko and neighbouring mainland. The total land and lake area ceded under the treaty being 16,170 sq. m. These terms were far more onerous than those presented by Russia in the Moscow negotiations of Oct.-Nov. 1939, especially as the ceded ter. included the whole Mannerheim Line defences: nor were any concessions made to F. such as had been previously proposed by the Soviet. But at least F. retained her independence. F. was able to hold out against its powerful enemy for as long as it did owing to the discipline of the people and the absence of any 'Fifth-Column' in the country. This absence was due to the virtual elimination of social injustice in F. and the consequent acceptance by all sections of the pop. of the position that the war was their war and not merely the war of one economic group or other in the country.

When Hitler invaded Russia in 1941 F. at once became involved in hostilities with Soviet Russia, reoccupying most of the ter. ceded under the treaty of 1940. In 1944 the Russians, who had been counter-attacking throughout 1943-4, made a determined effort to eliminate F. from the war. Finnish resistance was overcome, Viipuri falling on 20 June. In accordance with Russian conditions, the Finnish Gov. called upon the Ger. Gov. to withdraw Ger. forces from Finnish Lapland by 15 Sept. Four days after that date the 'cease fire' was sounded in F. and a peace delegation went to Moscow. On 19 Sept. an armistice was signed by Russia, Great Britain, and F. Territorial concessions were severe. Finnish troops were to be withdrawn behind the frontiers fixed by the treaty of 12 Mar. 1940, between the U.S.S.R. and F.; F. agreed to cede the Petsamo area, its only outlet on the Arctic Ocean, and to lease for 50 years the Porkkala headland, with a considerable stretch of sea and land, for use as a military base. The leased ter. was handed back to F. in 1955 without compensations. F. also undertook to pay 300 million dollars in reparations within 6 years. Of the 3 major problems which faced F. in the post-war period, the foremost was to build up relations with the Soviet Union on a basis of peaceful neighbourly dealings between 2 sovereign states of widely different size and power. On economic lines the reconstruction and resettlement of the pop. from the ceded ters. was an undertaking of major importance and the payment of the very heavy war-reparations to Russia another remarkable achievement. All these problems would seem to have been successfully solved in less than 10 years although they have left the nation economically exhausted though (1957) showing promising

signs of rapid recovery. See E. Young, *The Land of the Thousand Lakes*, 1912; A. M. Scott, *Suomi, The Land of The Finns*, 1926; W. E. Hiley, *The Forest Industry of Finland*, 1928; J. W. Archibley, *Finland*, 1931; Agnes Rothery, *Finland: the New Nation*, 1936; J. H. Wuorinen, *Finland: An Historical Survey*, 1938; W. N. Bugbee, *The Spirit of Finland*, 1940; J. Langdon-Davies, *Finland: The First Total War*, 1940; H.M.S.O. (Cmd. 6586), *Armistice with Finland* (19 September 1944); Royal Institute of International Affairs, *The Scandinavian States and Finland*, 1951; C. G. E. Mannerheim, *The Memoirs of Marshal Mannerheim* (trans.), 1964; Wendy Hall, *Green, Gold and Granite, A Background to Finland*, 1954. See further under EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.

Finland, Gulf of, E. arm of the Baltic Sea, having F. on its N. shores, and Russia and Estonia to the E. and S. It is 260 m. long, and 25 to 90 m. broad. Into it flow the Kymi and various lesser rivs. from F.; from the E. the Neva, draining the great lakes, Omega and Ladoga, and from the S. the Narva, draining Lake Peipus. It is connected with the Saimaa Lake by the Saimaa Canal. The Finnish coast of the G. is very dangerous, owing to its shoals and is. The water is slightly salt and not very deep, being covered with ice for about 20 weeks in the year in the E. end, while the W. end remains ice-free.

Finlay, George (1799-1875), historian, b. Faversham, Kent, and educ. at Glasgow and Göttingen. Most of his time was spent in writing the hist. of Greece (where he lived from 1854), the first part of which, *Greece under the Romans*, was pub. in 1844. He wrote also *History of the Byzantine and Greek Empires from 716-1453*, 1854, and *History of the Greek Revolution*, 1861.

Finns, see FIANS.

Finnmark, prov. (or fylke) of Norway, in the extreme N., with a rocky, indented coast and a barren mountainous interior. Fishing is the main industry. Pop. (including 18,000 Lapps) 65,000. Chief towns are fishing ports of Hammerfest, Vardø and Vadsø, and mining towns of Kirkenes (not far from the Russian border). Wholesale destruction of F. was carried out by the Germans in 1944, and 45,000 people were deported.

Finns, group of peoples in N. and E. Europe speaking languages of the Finnish family. They are divided into 4 sub-groups: (1) the Baltic, comprising the F. proper of Finland, the Karelians, the Estonians, and a number of small peoples; (2) the Lapps; (3) the Volga F.—the Mordva and the Mari; and (4) the Permian F.—the Udmurts and the Komi. They have lived in their present areas since ancient times, being exposed to the pressure of stronger neighbours—Scandinavians, Germans, and Russians—and for the most part under their rule. The Russians have assimilated a number of Finnish tribes which inhabited what is now the centre and N. of European

Russia, and the Great Russians are largely the product of this process. Christianised by their neighbours, the F. fell under their cultural influence; the use of Finnish languages for writing started comparatively late—Komi in the 14th cent. (see ST STEPHEN OF PERM), Finnish and Estonian in the 16th, others in the 19th-20th cents. The Finnish languages are related to the Ugrian and are often treated together with them as a single Finno-Ugrian family. Racially the F. belong to 3 sub-races of the White or Europeoid race—the Nordic, the Baltic, and the Ural—which is transitional to the Mongoloid race.

Fins, flattened extensions from the bodies of aquatic animals, which help to balance and propel these organisms through the water. In the case of fish they may be paired F. or median F., the former including pectoral and ventral F., and the latter caudal and dorsal F., these F. being supported by a series of cartilaginous or bony rays. The F. in cetaceans are simple extensions of the soft tissue and have no bony rays. The term may also be applied to other aquatic animals, as in the case of the tadpole's tail. Among the invertebrates any expanded part of the body which helps in swimming is termed a fin.

Finsbury, metropolitan bor. (the 2nd smallest) of London, lying to the NW. of the city of London. The name means 'Finn's manor.' It has many historical associations, and in late Tudor and Stuart times was a fashionable dist. Moorfields, on the E. side, was a recreation ground from medieval times. Among interesting evidences of the past are the Charterhouse and Bunhill Fields (qq.v.). Near the latter many victims of the Great Plague were buried. S. of Bunhill Fields is the Artillery Ground, which since 1683 has belonged to the Honourable Artillery Company, with barracks and armoury. The prin. industry is watch-making, and working of precious metals; there are also large printing works. The S. part of the bor. is generally called Clerkenwell (q.v.). Together with Shoreditch, F. returns 1 member to parliament. Area 587 ac.; pop. 35,500.

Finsbury Park, dist. in the bor. of Hornsey, Middx, England. It takes its name from the park (121 ac.) formerly known as Hornsey Wood, but renamed after the London bor. in 1857. It is a well-planted park with good views.

Finsen, Niels Ryberg (1860-1904), Dan. physician, b. Thorshavn, Faeroe Is. He took his degree in medicine at Copenhagen, where he lectured on anatomy. It was here that he discovered the therapeutic effect of light upon certain diseases. He advocated the exclusion of the chemical rays from people suffering from small-pox, maintaining that this prevented the pustules from suppurating, and used ultra-violet rays for curing certain diseases of the skin, for example lupus. For this process he invented a lamp which collects the light by means of a quartz lens and also provides for cooling it.

In 1903 he was awarded the Nobel prize. He wrote *Chemical Rays and Variola*, 1894, and *Phototherapy* (trans. from the German by J. H. Sequeira, 1901).

Finsteraarhorn, highest peak of the Bernese Alps, Switzerland, about 40 m. SE. of Bern: height 14,025 ft. It was first climbed in 1829.

Finstertal, Ger. tn in the dist. of Kottbus, 28 m. WSW. of Kottbus (q.v.). In 1835 it came into the possession of Saxony, and in 1815 of Prussia. There is a 16th-cent. church, and a 17th-cent. castle. Lignite is mined in the area, and there are textile, paper, and metal industries. Pop. 20,000.

Finzi, Gerald (1901-58), composer. b. London, studied under Bairstow and

Most F.s are the result of glacial erosion. Old riv. valleys are widened, and their floors excavated below sea-level by the action of glaciers. F.s are found in Norway, Iceland, Greenland, on parts of the Amer. coast and in New Zealand. Those of Norway are among the most notable; Sogne F., one of the largest, being 100 m. in length, and Hardanger F. considerably more than half that length. Christiania (Oslo), Aurlands, and Trondhjem are also well known, the last being the scene of much naval and air activity in the Second World War in 1939-40, between the Brit. and Ger. forces. *See also* NORWAY.

Florin Grass, *see* AGROSTIS.

Floun, *see* FIANS.

Fipple Flute, *see* RECORDER.



D. McLeish

THE AURLANDS FJORD, ONE OF THE GRANDEST IN NORWAY

R. O. Morris. After a short period (1930-3) as prof. of composition at the Royal Academy of Music he withdrew to the country and devoted himself entirely to creative work. His instrumental works include an *Introid* for violin and orchestra, a clarinet concerto, and a *Fantasia and Toccata* for piano and orchestra, also a little orchestral and chamber music. His vocal works show in particular a sensitive choice and treatment of fine poetry: Crashaw, Wordsworth, and Blunden for chorus and orchestra, Drummond and Bridges for unaccompanied chorus, Christina Rossetti for part-songs with piano, Traherne, Peele, and Milton for voice and orchestra, and Shakespeare and Hardy for songs.

Fjord, or **Fjord**, narrow inlet of the sea, having high coasts on either side, and cutting far into the land. These F.s, which are found on mountainous coasts, are exceedingly deep, the deepest part being the farthest inland, while the bottom shelves up to the coast and the mt sides are often lined with waterfalls.

Fir, strictly speaking, is the popular name for *Abies*, a genus of coniferae, but the genus *Picea* and others are often included. The leaves are needle-shaped and in *Abies* have a rounded base; those of *Picea* are decurrent. *Abies* cones are erect, and when ripe the scales fall off leaving the upright axis standing alone; the cones of *Picea* are pendent. *A. pectinata* is the European silver F., *A. nobilis* is the Noble silver F. of America, *A. Nordmannica*, the Crimean silver F., *A. amabilis*, the red silver F. of U.S.A., *A. venusta*, the Monteroy silver F., and *A. religiosa*, the Mexican silver F., *P. excelsa*, is the Norway spruce. All these trees are commonly cultivated, but the Norway spruce flourishes in severe exposed situations, and is widely distributed over N. Europe. The timber of this tree constitutes deal, and the trunks are used for masts, etc. There are many valuable products from other members of the order, e.g. gums, resins, pitch, etc., and *A. balsamea* yields Canada balsam. *See* FORESTRY; TIMBER; TREE.

Fir-bolg, in Irish tradition, a race of early inhab. of Ireland. See IRELAND, *History*.

Firando, see HIRADO.

Firdawsi, **Firdausi**, **Ferdousi** (c. AD 935–c. 1020), Persian poet, author of the Persian epic, the *Shahnama* (Book of Kings), a long poem of c. 60,000 couplets, incorporating some 1000 couplets by the earlier poet, Daqiqi (q.v.). The *Shahnama*, which enjoys an unrivalled popularity in Persia, relates the legendary hist. of Persia from the beginning to the Arab conquest in the 7th cent. AD. It was dedicated in its final form to Sultan Mahmud of Ghazna in 1010. The latter is related to have offered F. an inadequate reward for his labours. F. fled from Ghazna and satirised Mahmud. He finally returned to his native Tus where he d. He also wrote the romance *Yusuf and Zuleykha*. The chief eds. of the *Shahnama* are: Turner Macan, 1829; Julius von Mohl, pub. with a trans. into Fr., 1876–8; J. A. Vulfers, and S. Landaner, 1877–83; A. G. and E. Warner, 1905. See T. Nöldeke, *Das Iranische National-epos*, 1896; H. Massé, *Les Épopées Persanes*, 1935.

Fire. Although the statement has been not infrequently made that tribes totally ignorant of F. have been discovered, the evidence on this point is very weak, and it is questionable whether such a race is in existence at the present time. There are considerable variations of detail in the primitive methods of producing F., but they are all based on the principle of either concussion or friction. The simplest form of the latter, rubbing a stick along a groove in another stick, is practised in Tahiti, Samoa, the Sandwich Is., and other places. The stick is twirled round in a hole in the other piece of wood in Australia, Kamchatka, Ceylon, South Africa, the West Indies, North and Central America, and as far S. as the Straits of Magellan. Concussion has also been known as a means of producing F. from very early times, and such methods as striking 2 stones together, striking a stone on a piece of wood, or striking 2 bamboos together are in use. The employment of a burning-glass is also of great antiquity; Aristophanes mentions one in *The Clouds*. There are many different legends as to the origin of F. In Gk mythology, Prometheus brings down the torch he has lighted at the sun; Ukko, the Estonian god, strikes his stone with his steel and sends forth F. in the shape of lightning; in North Amer. legend F. is struck from the hoofs of the great buffalo as he gallops over the prairie, and thunder in the Hindu mythology is the clatter of the hoofs of the sun's horses on the sky. Primitive man found it convenient to have a F. always burning in a public building, hence the prytaneum gradually became a religious institution, round which centred also all civil and political interests. The principle of an ever-burning F. was practised by the Romans, Egyptians, Greeks, Persians, Aztecs, Peruvians, etc. If the F. of Vesta at

Rome, for instance, went out, all business was suspended until it had been rekindled with appropriate ceremonies. As the sun appears to lose its power to provide heat at certain times, the longest day of summer was in many religions an occasion for ceremonious rites connected with F. It was the belief of many anct philosophers, e.g. the Stoics, that the world would perish by F.; the Scandinavian mythology and the Apocrypha (2 Esdras xvi. 15) also mention this belief. For further details as to folk-lore, etc., see ORDEAL; PARSEES; and ZOROASTRIANISM; for the physics and chem. of F. see COMBUSTION; FLAME; and FUELS. See also C. F. Dupuis, *Origine de tous les cultes*, 1794; E. B. Tylor, *Researches in the Early History of Mankind*, 1865; Sir J. G. Frazer, *The Golden Bough*, 1890; J. A. G. Pauschmann, *Das Feuer und die Menschheit*, 1908; W. Hough, *Fire as an Agent in Human Culture*, 1926.

Fire Alarms, see FIRE BRIGADES.

Fire Brigades and Fire Fighting. F. B. are bodies of trained men and their equipment for fighting fires, and for saving life and property from loss and damage from fire or any other causes. Under this heading will be treated the personnel and F. appliances throughout the Brit. Isles, but similar precautions for dealing with uncontrolled fire are taken in every tn of size and importance throughout the world. The first reference to a F. B. relates to China, c. 4000 BC. In 2000 BC Egypt had an organisation for fighting fires, and the Romans started to form their B.s under a *praefectum vigillum*, or prefect of the watch, about 150 BC, and by about 40 BC theirs was a highly trained and efficient B. In England there is no record of very early F. B.s, although legislation in 1189 encouraged the use of building materials of a more fire-resisting nature than hitherto. In 1212 also, it was decreed that new houses were not to be roofed with reeds, rushes, straw or stubble, and that water should be kept for F. purposes.

The first fire insurance office was founded in London in 1680—The Phoenix (not to be confused with the Phoenix which was founded a century later), and the first body of F. fighters was then organised. These men were drawn from the Thames watermen, and each insurance company dressed their men in distinctive livery. It is not known how they were equipped. In 1825 some of the rival companies realised the desirability of united effort, and later all the more memorable insurance offices merged their F. fighters in the formation of the London Fire Engine Estab. in 1833, later to become, by act of parliament in 1865, the Metropolitan Fire Brigade. Money was raised for the maintenance of this B. by (i) a halfpenny rate on the rateable property of London; (ii) a contribution from the insurance companies of £25 for every million pounds gross insured; and (iii) a £10,000 grant from the gov. In 1904 the title was changed to the 'London Fire Brigade' which, by 1938, had reached

a strength of 1 chief officer, 6 senior officers, and 2241 other officers and men. There were 59 land fire stations and 3 R. Thames stations. In other important cities and towns and throughout the country, most local authorities maintained B.s. staffed by professionals or volunteers.

Organisation.—The first F. B. act for over 40 years was passed by parliament in 1938. It required, among other things, that certain local authorities should make provision for the extinction of fires and the protection of life and property by providing F. B.s, making efficient arrangements for them to be called, and arrangements for mutual assistance between fire authorities. This act had not come into operation, however, before the first Air Raid Precautions Act, 1937, which required air raid precautions and fire

changeable, and it was this body which successfully met the varying forms of air attack from 1941 until the end of the war. A National Fire Service College was established where officers and prospective officers were given extensive training in all aspects of F. B. and fire prevention. One of the important developments within the National Fire Service was the selection of certain suitable officers for specialised training over a long period in the subjects of fire prevention and fire protection, and these officers were available to give free advice to local authorities, schools, hospitals, factory managers, and private householders.

As the result of a promise made by the home secretary that, after the war, local authorities might again control their own F. B.s, the Fire Services Act was passed in 1947 making co. councils and co. bor. councils the 'fire authorities' from 1 April 1948. The 1947 act provides that, among other things, fire authorities shall secure:

1. Such a fire brigade and such equipment as may be necessary to meet efficiently all normal requirements;
2. The efficient training of members of the fire brigade;
3. Arrangements for dealing with calls;
4. Information, by inspection and otherwise, required for fire-fighting purposes, with respect to the character of buildings and other property;
5. Arrangements for mitigating damage to property resulting from measures taken in dealing with fires (i.e. salvage);
6. Arrangements for giving advice on fire prevention, fire protection and means of escape in case of fire.

Mutual assistance schemes must be made between adjoining fire authorities' areas, so there is no question whatever of there being any boundaries from a fire point of view. The only boundaries are administrative ones. The secretary of state is the controlling authority, and a staff of H.M. inspectors is responsible for ensuring that effective and efficient F. B.s are maintained. Regulations made under the 1947 Act establish standardised ranks, rank markings, rates of pay, conditions of service, etc., throughout the country. The ranks in the F. B.s are now: chief officer, assistant chief officer, divisional officer, assistant divisional officer, station officer, sub-officer, leading fireman, and fireman. Training establishments are organised by the larger F. B. where members of those F. B. having no training centres may also receive initial and supplementary training. The Fire Service College gives advanced and specialised training to officers. Financially, the fire authorities bear 75 per cent of the cost of F. B., the remaining 25 per cent coming from the Treasury. By the Civil Defence Act, 1948, an auxiliary organisation, including women members, was again set up (see FIRE SERVICE, AUXILIARY).

The account for fire damage (Britain and Rep. of Ireland) in recent years is given in the following table:

YEAR	Loss
1954 . . .	£26,184,000
1955 . . .	£27,645,000
1956 . . .	£27,512,000



Merryweather

A MODERN LIMOUSINE-TYPE SELF-PROPELLED PUMP-ESCAPE

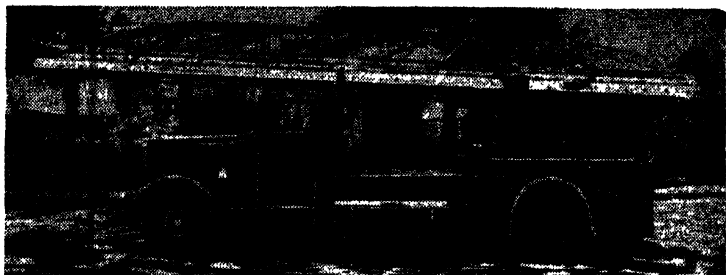
schemes to be prepared, such schemes to include an emergency F. B. service and the recruiting and training of auxiliary firemen. These schemes brought into being the Auxiliary Fire Service which consisted of volunteers from all walks of life who trained in their spare time as auxiliary firemen. At the outbreak of the Second World War many thousands of part-time firemen had completed their initial training, and many of them entered their F. B.s on a full-time basis, while others continued with evening and night duties. The auxiliary firemen and their 'Regular' colleagues met and fought the great air raid attacks of 1940 and 1941. Owing to the widespread nature and severity of the Ger. air attack, however, the need for greater mobility and uniformity of practice and equipment was realised, and in Aug. 1941 all local authority F. B.s, 'regular' and 'auxiliary', were united to form the National Fire Service. The organisation within the National Fire Service enabled vast numbers of appliances and men to be mobilised at a moment's notice to any part of the country requiring assistance, with the advantage, *inter alia*, that all equipment, appliances, etc., were uniform and inter-

These figures relate to material loss only, and take no account of consequential loss. Lives lost in accidents caused by burning, combustion, etc., in England, Wales, and Scotland numbered 763 in 1953, 753 in 1954, and 815 in 1955. The growth of the inflammability of certain building materials, and the use in industry of highly inflammable and complex chemicals, together with the increased importance of conserving food-stuffs and timber in co. dists., have rendered adequate fire protection essential. This has been made possible during recent years by the great advances made in the science of F. F., in the specialised knowledge of fire engineers, and in the increase in efficiency of mechanically propelled vehicles.

The earliest record of fire appliances is of a pump invented by Ctesibios, a Greek

its high output for small weight, and very high efficiency—important factors in fire appliances.

Present-day practice is the combination, as one unit, of the internal-combustion engine and the centrifugal pump which, instead of working on the principle of displacement by pistons or plungers, makes use of the natural law known as centrifugal force, and consists of a revolving impellor which receives water at its centre and which discharges it from the outer edge of the blades. The water is converted into the pressure energy required by the general construction of the pump casing. Pumping cannot be commenced until water is within the pump casing, and this is either obtained by introducing water into the pump under pressure (e.g. from a street main supply) or by 'lifting' water from an open supply



Merryweather

TURNTABLE LADDER

living in Egypt, about 150 bc. There is no direct record of it, but Hero of Alexandria described it in the same century. Later buckets, simple pumps, and squirts were used, although inventiveness in this direction seems to have been ignored, for at the time of the Great Fire of London in 1666, there were still only squirts and simple pumps available.

Pumps.—The first known appliance for delivering a continuous stream of water was described in 1675, when an air-chamber was coupled to a manual piston-type pump. During the latter part of the 18th cent., the manual type of fire engine was gradually replaced by a combination of horses and steam engines. The horses, specially trained, pulled to the scene of the fire a trolley upon which was a steam engine for pumping purposes. These engines were kept with fires banked down or ready for quick ignition, and were quickly brought to life so that a good head of steam was available by the time the engine had arrived at the fire. At the commencement of the 20th cent. the internal-combustion engine began to replace the steam-pump and the horses, and the design of the pumps themselves started to change from the reciprocating-piston type to the centrifugal pump with

by 'priming,' i.e. by reducing pressure within the pump and suction hose to below atmospheric pressure (14.7 lb. per sq. in.), thereby causing the atmospheric pressure on the surface of the open water supply to drive the water up the suction hose and into the pump to fill the vacuum created. Under absolute vacuum conditions a maximum 'lift' of 34 ft is theoretically possible, but under the most favourable working conditions the maximum possible 'lift' is 28-30 ft. See also PUMPS.

Fire 'Escapes' (Ladders).—In residential or factory areas the 'first attendance' to a fire usually includes an escape carrying appliance and the ladders, known as escapes, are designed to be used rapidly for rescue purposes up to a height of about 50 ft. Designs vary, but escapes consist generally of an extending ladder in 3 sections which are extended by means of steel cables from drums and winch handles, mounted on a sliding carriage enabling the elevation of the ladders to be varied as required. Very rapid and effective use is often made of this piece of equipment. With the increase in height of modern buildings came the need for firemen to get still higher with their apparatus and the escape was developed

into the turntable ladder which, although similar in principle to the escape, is constructed normally of steel, power driven, and, as the name implies, is mounted on a turntable on the main vehicle, by which it can be rotated through a complete circle. By the simple operation of levers, the ladders may be manoeuvred into any position required within its range (up to 150 ft). The turntable ladder is not only used for rescue purposes, but as a water tower from the top of which large quantities of water can be pumped on to a high, burning building.

Various other ladders for use in varying circumstances are carried on fire appliances, together with numerous items of 'small gear,' each piece having its own particular use.

Hose.—The original hose used in F. F. was made of leather, riveted throughout its length. The excessive weight and its inflexibility confined the lengths to short pieces only. The first flexible hose was made in 1872 by J. van de Hyde, snr., and J. van de Hyde, jnr., by sewing together the edges of strips of leather. This was a great step forward. Modern hose is made of vegetable fibres woven in such a way as to withstand considerable internal pressures and rough abrasions externally. The main fibres used are flax, jute, ramie, cotton, and hemp, although synthetic fibres (rayon, nylon, and terylene) are being increasingly used. Hose is mainly of 2 types—'unlined,' which is the ordinary woven fibre, and 'lined,' which contains a very fine layer of rubber or latex covering the whole of the inside of the hose. The latter is the heavier to handle, but the smooth surface of the rubber greatly minimises the friction on the water, and also reduces the amount of water damage within buildings, for this type of hose does not leak as the 'unlined' type does. 'Unlined' hose is usually in 75-ft or 100-ft lengths, and 'lined' in 50-ft lengths, each length being capable of being coupled to any other by (usually) light alloy or brass instantaneous couplings. The diameter of hose varies according to the use to which it will most likely be put, but the most common size for all normal F. F. purposes is 2½ in. diameter. Fire appliances each carry 1900–2000 ft of hose according to locality and need.

Fire Alarms (Street).—Most large built-up areas are equipped with an electric fire-alarm system, with fire-alarm posts situated at convenient positions in the streets and roads, which connect direct to the fire station. The fire alarm is usually operated by breaking a glass panel and pulling a knob. This immediately makes electrical connection with the fire station where bells are automatically actuated, and the code number of the fire alarm which has been operated is punched out on a tape machine, together with the exact time. There are 2 main types of fire alarm—'open circuit,' where the actuation of a fire alarm box closes the electrical circuit, and the 'closed circuit' where actuation of a box breaks the electrical

circuit, in each case causing the alarms to be given at the station. One disadvantage of most street fire-alarm systems is that the person giving the alarm must wait at the post until the arrival of the B., and then direct them to the actual address of the fire. Modern development is overcoming this feature by enclosing a telephone in the alarm post so that the caller may speak to the fire station and give necessary details of the address. It is questionable whether, in highly built-up areas, street fire-alarm systems are now so essential as they were, for, with telephones so often readily available, and with emergency facilities, this latter method of calling the B. is almost as quick as the street fire-alarm system, with the advantage also that the full address of the fire can be given.

Fire Alarms (Automatic).—Automatic fire alarms within buildings are devices which automatically respond to any sudden rise in temp. or any gradual rise above a predetermined temp. within a room or compartment, and give an alarm of fire by ringing a bell either outside the building protected to call attention to passers-by, or in a fire station, or both. These automatic alarms work on one of the following principles: by (a) thermostatic control, where a rise in temp. will expand a piece of metal situated in small containers fitted at intervals to the ceiling; (b) the expansion of a volatile liquid in a small diameter copper tube running round the walls at ceiling level; (c) the expansion of lengths of wire situated at intervals on the walls causing a weight to drop; or (d) using the resistance differential between an insulated wire and a bare when exposed to heat. In each case the action causes an electric circuit to be completed for the operation of the alarm bell. See also SMOKE DETECTORS.

Automatic Sprinklers.—A sprinkler system within a building consists of a range of pipes fitted at ceiling level and connected to a pressure supply of water (e.g. in mains, overhead tank, pump from riv., etc.). On the range of pipes are situated at regular intervals sprinkler heads or outlets, having ½-in. diameter, which are sealed in such a manner that they are automatically opened at a predetermined temp. These sprinkler heads are fitted normally 1 for each 100 sq. ft (i.e. at 10-ft intervals) and the seal consists of a seating held in position by a special solder which melts, or by a small quartz bulb containing a volatile spirit which when expanding on being heated, shatters the bulb, thereby releasing the valve seating. The operating temp. may be varied, and is normally at 155° F. The water issuing from the pipe impinges on a deflector which causes it to 'sprinkle' in umbrella shape over a floor area of approximately 100 sq. ft. In buildings which may become very cold in winter, e.g. riverside warehouses, with the possibility of water in a sprinkler system freezing, a special 'alternate' system may be installed whereby the pipes are charged in winter time with air under pressure

but with an automatic device for rapidly expelling the air and admitting the water in the event of fire. The value of the automatic sprinkler installation lies in its ability not only to detect a fire but also to confine it or extinguish it, and also to give warning by an alarm bell that it is in operation.

Adaptations of the sprinkler system have been made for use on oil fires where water at ordinary pressures would not be suitable for extinguishing burning oil. This adaptation causes water to be ejected on to the surface of the burning oil at high pressure, thereby creating a water-oil emulsion which will not burn readily. Further variations of the sprinkler system may be found outside of buildings which are separated from others only by a short distance. This variation, known as a 'drencher system,' is to create a water curtain down windows and other openings to prevent fire spreading from the nearby buildings. A similar device may be found in many theatres, where the purpose is to provide a cascade of water down the safety curtain to keep it from buckling and falling in the event of a fire on the stage. A system, not unlike the automatic sprinkler system in principle, is the automatic carbon dioxide (CO_2) installation which is used to extinguish fires involving oils, spirits, or electrical equipment. On the automatic opening of a valve at a predetermined temp., the room or chamber protected is flooded with carbon dioxide gas. One advantage of this system is that no water damage is caused to delicate electrical apparatus, and on the dispersal of the gas no damage has been caused to any unburned oil or spirits.

Fire Extinguishing Media.—To produce the phenomena of fire 3 factors are essential to combustion. They are: 1, the presence of a combustible material, or fuel; 2, the presence of air or oxygen to support the combustion; and 3, the attainment and maintenance of a minimum temp., according to the nature involved. If any one of these 3 essentials is removed then combustion will cease, and fire extinction consists of this action either by 1, removing the burning material (starvation of the fire of fuel); 2, reducing the available air or oxygen (smothering); or 3, reducing the burning material to a temp. below which it will not continue to ignite or re-ignite (cooling). Some methods of extinguishment involve more than one of the above.

Water is the most common extinguishing agent. In the first place, it is the cheapest and most readily available agent, but, secondly, and particularly, it is a substance which will absorb most heat from a burning material and thereby reduce it below its ignition temp. This is due to the fact that water absorbs 85 calories per gram (153 B.Th.U. per lb.) on being heated from normal temp. to boiling point, but to convert boiling water to steam will absorb 540 calories per gram (973 B.Th.U. per lb.). It will be seen, therefore, that if water is to be used to best advantage it should be converted into steam by the

burning material in order that the maximum possible heat is thereby absorbed, for it takes about 6 times as much heat to convert water to steam as it does to raise it to its boiling point. These figures, compared with those relating to other extinguishing media, show that water has a very much greater capacity of absorbing heat and consequent reduction of the temp. of the burning material to below its ignition temp. *Foam* is a chemically produced solution not unlike thick soap suds in appearance. It is used for the smothering (or excluding oxygen from) burning oils, spirits, fats, etc. Water on this type of fire would have the effect of spreading the burning material. *Carbon dioxide*, *methyl bromide*, *carbon tetrachloride*, and *chlorobromomethane* are inert gases, heavier than air, all of which are used for their smothering effect on burning materials. They have also some cooling properties, but limited compared with water. These extinguishing agents are particularly suitable for use on electrical apparatus, for they are non-conducting and non-damaging. However, the dangers of inhaling the vapours of these substances should not be overlooked. Certain *dry powders* have been used for F. F. purposes. Generally these powders contain a large percentage of sodium bicarbonate, together with chalk, whiting, sand, etc., and for ordinary fires are no more effective than a bucket of water. Various methods are used to eject forcibly the powder on to the fire. Certain classes of fires, however, cannot be extinguished by water or liquid extinguishers, and dry powders of one kind or another only are possible, e.g. for fires involving magnesium, sodium, etc.

Fire Prevention.—In recent years considerable emphasis has been placed on the specialised knowledge of fire prevention, and the protection of life and property against fire, as opposed to fire extinction, and there is in every F. B. at least 1 specially trained officer who is available to give advice on these subjects. In principle, the aim of these specialists is to reduce the work of the F. fighter by, if possible, preventing fires, or if that is not possible, the danger of loss of life, to lessen and to minimise the spread of fire and thereby reduce the damage. These aims are carried into effect by the inspection of all types of property and the giving of free advice to the occupiers, on matters relating to building construction, means of escape in case of fire, fire prevention, water supplies, access for fire appliances, etc. (See also FIRE-RESISTING BUILDINGS AND MATERIALS.) The following is a summary of fire prevention legislation concerning chiefly means of escape and public safety:

- 1, Public Health Act, 1936 (sections 59 and 60);
- 2, Factories Act, 1937 (sections 34, 36, and 37);
- 3, Miscellaneous Factory Orders and Regulations;
- 4, Celluloid and Cinematograph Film Act;

- 5, Cinematograph Acts, 1909 and 1952, and Regulations;
- 6, London Building Acts;
- 7, Regulations made under Education Act, 1944;
- 8, Children and Young Persons Acts, 1933 and 1952;
- 9, Theatres Act, 1843;
- 10, Children's Act, 1948, and Regulations;
- 11, Local Acts, Orders, Regulations, and Byelaws;
- 12, Petroleum (Consolidation) Act, 1928, and Regulations;
- 13, Explosives Acts;
- 14, Heating Appliances (Fireguards) Act, 1952, and Regulations.

See R. Northwood, *Fire Extinguishment and Fire Alarm Systems*, 1928; A. N. Cameron, *Chemistry in Relation to Fire Risk and Fire Extinction*, 1933; *Chemical Fires* (revised), 1934; J. J. Willanson, *General Fire Hazards and Fire Protection*, 1935; J. H. Blood, *Technology of Fire Insurance*, 1935; J. Bowman, *Hydraulics for Fire Engineers*, 1936; *Manual of Firemanship: A survey of the Science of Fire-fighting* (H.M.S.O.), 1943 ff.; Building Research Committee and Department of Scientific and Industrial Research, *Fire Grading of Buildings* (H.M.S.O.), 1946; H. S. Hodges, *Electricity and Fire Risk* 1947; J. W. Kenyon, *The Fourth Arm*, 1948; Sir A. Firebrace, *Fire Service Memories*, 1949.

Fire Engines, Escapes, etc., see FIRE BRIGADES.

Fire-extinguishing Compounds, see FIRE BRIGADES—*Fire Extinguishing Media*.

Fire Insurance, see INSURANCE.

Fire of London, see GREAT FIRE.

Fire-raising, term used in Scots law for what is known in Eng. law as arson. It applies to the setting fire wilfully to someone else's property, for example ships, buildings, growing wood, corn, coal or articles of that sort. The law with regard to this also forbids setting fire to one's own or other people's property with the intention of defrauding the insurance company, and these offences are punished in Scotland with imprisonment.

Fire Resisting Buildings and Materials. The purpose of erecting F. R. B. is to give greater safety to life and property by providing safe exit for occupants, reducing outbreaks of F. and minimising F. spread. This is achieved largely by the use of B. M. which are not only incombustible but which will not readily transmit heat. They must also withstand rapid cooling during F. fighting. Those B. M. which offer the most resistance to F. are solid clay bricks, stone, concrete. Steel is incombustible but if exposed to heat will (a) expand and cause damage to the structure, and (b) lose much of its structural strength at temps. reached in moderate F.s. Cast iron will 'resist' F. but may collapse suddenly on being cooled. These latter 2 M. should be well clad with concrete or other non-heat conducting and incombustible M.

Considerable progress has been made in

recent years in the classification of B. M. and elements of structure into various grades of F. resistance following subjection to comprehensive standard tests. This work is carried out jointly by the Dept of Scientific and Industrial Research and the F. Offices' Committee. As a result, architects, builders, and others, having determined the degree of resistance required for their particular purpose, may select M. and forms of construction falling within certain specified grades ranging from $\frac{1}{2}$ hr to 6 hrs resistance to F. spread. Wall boards or B. boards used for internal work are also graded according to combustibility, but some of these M., although in themselves comparatively incombustible, have the character of spreading flame rapidly across their surface. Large B. sub-divided by internal F. R. walls must have door and window openings protected to be effective. The F. Offices' Committee issues rules relating to the construction and fitting of F. R. doors, etc. These, to be completely effective, should be self closing and held open only by a fusible link which will melt at a predetermined temp.—thus allowing the door to close.

Timber of the hardwood type (e.g. oak, teak) 2 in. thick gives a good degree of F. resistance for doors. Other timber with a large cross-sectional area may withstand F. for a considerable time before failing, and may be more reliable than unprotected steelwork. Woodwork may be given treatment by impregnation with certain ammonium salts or painted with a mixture of sodium silicate and china clay. This produces a 'flame retardant' effect rather than make the timber F. R. Fabrics, draperies, etc., used on the stage in theatres are usually required by the licensing authorities to be dipped or sprayed with various solutions for the same purpose. These solutions often contain boric acid, borax, and sodium phosphate.

The London Co. Council make stringent regulations relating to F. protection in certain classes of B.

Fire Service, Auxiliary. Under regulations made under section 2, Civil Defence Act, 1948, F. authorities are required to organise their F. brigades for the purpose of civil defence (q.v.). As part of this general function, they are required to 'enrol auxiliary firemen as members of fire brigades for service therein.' For convenience of reference, the A. organisation, which includes women members, is known as the A. F. S. but the personnel are members of the individual brigades in which they enrol and not of any national organisation. The activities of the A. F. S., except in a war emergency, are restricted to such duties as are desirable for training; this training is, as a rule, based on existing F. stations, instruction being given by regular members of F. brigades. The training is designed to give the A. a thorough knowledge of the basic principles of firemanship, the improvisation of water supplies, rescue from F., and civil defence. At a suitable stage of their

training, opportunities are provided by many F. authorities for A.s to stand-by at F. stations for attendance at F.s.

The training of A. firewomen covers duties in relation to F. S. organisation and administration, control and mobilising of appliances, and the use of radio. They may also be taught to drive and serve as members of the crews of mobile control vans, wireless vans, canteen vans, and mobile kitchens. Some are trained as despatch riders. A number of appliances have been specially developed for emergency F. fighting, these include a self-propelled pump and special vehicles such as control units, communications units, hose layers, and transportable water units; new equipment includes lightweight plaster, piping, and tanks as well as large-diameter hose for large-scale water relays.

Fire-ships, vessels filled with combustible materials for the purpose of bringing destruction on the enemy. The 'fire-chamber' was built between the decks from bulkhead to forecabin and filled with various combustible materials, among them gun-powder. The F. were then set on fire and sent among the enemy, the men escaping in boats. They were employed to defend Antwerp in the siege of 1585, and in 1588 to destroy some of the ships of the Armada. In more modern times Lord Dundonald used them against the Fr. in 1809, but after that they were very little used. Certain kinds of floating fire were, however, used much earlier than any of these, some being mentioned by Livy as being used in the 2nd cent. BC.

Fire Tactics have undergone considerable modifications since the first introduction of firearms in warfare; the increased range and efficiency of the arms of infantry and artillery (qq.v.) have naturally made many changes. The method of delivering fire originally used by the Spaniards for infantry was for each man in succession to fire, and then to fall to the rear of the line to reload. This required a great degree of coolness and individual skill to be successfully carried out. As the handiness of the musket was improved rifle firing became more and more irregular, and by the middle of the 17th cent. it was the usual custom for the musketeers to F. 1 or 2 'voleros' or 'salves' and then charge. The 'linear' system consisted of 3 long lines of battalions, giving the utmost scope for F. T., as it was considered that the maximum weight of controlled fire at short range was a decisive factor. The Prussian system of F. discipline was originated by Leopold of Dessau and Frederick Wm I, and put into operation by Frederick the Great. Under this system a battalion consisted of 8 companies, which fired company volleys as follows. As the company on the extreme right began to fire, the 2nd company was at the ready, and so on; the same process was gone through on the left flank, so that by the time the centre companies had fired the end companies were again ready. Since that time rifles have become

efficacious at over 1000 yds, and the finding of the range has become a matter of importance. The F. T. of an infantry company are controlled by the non-commissioned officers and officers, who name the target and give the range. Firing by volleys is the usual method; save at short ranges independent F. and magazine F. are rarely adopted. The most important modification of rifle F. has been the adoption of rapid F. in 'bursts' as the normal method for infantry instead of slow continuous F. Five rounds a min. was the rate of normal F. and 15 rounds for rapid aimed rifle F. With the new FN rifle a rate of 650 rounds a min. is attainable, and with the machine carbine or sub-machine-gun, 500. Machine-gun F. T. are still somewhat indefinite, but one or two principles of action stand out clearly. It is important that whether they are used in numbers or as auxiliaries they should be free to move without being under the necessity of maintaining a relative position to some other unit. Machine-guns must also co-operate with other troops as closely as possible, and must be able to be concealed and evade the enemy's shrapnel. As the result of experience in the First World War, machine-gun companies are now attached to regular infantry battalions. The most favourable range for machine-gun F. is from 600 to 1400 yds. The same principle of firing in bursts is observed. As regards guns which come in the category of artillery, 4 methods of firing are used. When each gun is fired separately at a signal from the commander of the battery, this independent F. is used to find the range, etc. When guns F. at stated intervals all along the line of the battery, this is known as battery F. If the guns of each section are fired at the will of the commander thereof with no reference to the rest of the battery, this is known as section F. Firing by salvos is when all the guns F. simultaneously; this is only employed very rarely, as sometimes for salutes, etc. These principles, however, have but little relation to massed attacks by tanks—preceded by very mobile troops on motor cycles and parachutists operating well behind the opposing lines and armed with sub-machine-guns—co-operating with dive-bombing planes and other low-flying planes armed with machine-guns. These F. T. were employed by the Germans with overwhelming success against the armies and towns of Holland, Belgium, and France in May-June 1940, and very speedily resulted in the complete defeat of all 3 countries. In the later years of the war the Allies developed these F. T. with armoured formations and aircraft with devastating results against the Wehrmacht. See ARTILLERY; GUN; RIFLE.

Fire-watching, see CIVIL DEFENCE.

Firearms are dependent on the powder or propellant used in them. It is not known for certain where gunpowder was invented; but modern opinion traces its discovery to the E., and maintains that it was used originally as an incendiary rather than as a propellant. All that can

be said with certainty is that by 1250 Roger Bacon (q.v.) had in his possession a 'perfectly good receipt for 'black gunpowder,' the evolution of which was due to the discovery of the effect of using refined saltpetre and coarsely ground sulphur in place of the usual flowers of sulphur, or sublimed sulphur. These, combined with willow charcoal in the proportion 75 per cent saltpetre, 15 per cent charcoal, and 10 per cent sulphur, represent modern B.P. Earlier types had a lower percentage of saltpetre and were weaker propellants.

Primitive Firearms.—Early cannon and hand F. were made from wrought-iron bars forged very roughly and secured with a series of forged rings. Gaps between the bars were filled with molten copper or brass, and the weapons were but roughly shaped. Crude cannon were in use on the Continent by 1300, and were used by Edward III of England in his war against the Scots (1327). The first hand-guns appear at Perugia, Italy, in 1364, and were common by 1380 at Augsburg and probably at other large iron-manufacturing centres. These guns were simply tubes of wrought iron fixed upon wooden stocks. They were probably held in the left hand and fired by means of a match held in the right. Sometimes 2 men were employed, one to hold the gun, the other to apply the match.

Matchlocks.—By 1425 a mechanical lock for applying the match had been evolved, and the first matchlocks were in being, thus enabling one man to control one weapon. It now became possible for some precision to be achieved with the primitive F. of that period, and competitions for shooting were held at Augsburg and other continental centres. Two types of gun appear to have been in use, one the wrought-iron and banded conical gun, the other the plain cylindrical bored gun for firing leaden bullets only (see BULLET). The conical gun had the advantage of being able to fire not only bullets, but also a modification of cross-bow quarrels, incendiary and armour-piercing arrows, and pebbles of varying weight. Though not an accurate weapon, it was effective at close range. Guns of the latter type were used by mercenaries from Hainault in the 2nd battle of St Albans (1461), the first occasion on which hand-guns of any sort were used on Eng. soil. There is no further record of the use of F. in this country until 1486, when Henry VII ordered that half the royal guard should be armed with arquebuses. The arquebus (q.v.) was a simple matchlock gun carrying a solid bullet in a cylindrical barrel, and was fairly accurate up to about a range of 50 yds. With slight changes in lock action, calibre, and length of barrel, this simple form of matchlock arquebus or musket endured in the Brit. service until at least 1880. It was the standard military infantry weapon for practically all W. powers.

Wheel-locks.—Despite its simplicity, there were many objections to the match-

lock. The smoke of the matches would frequently disclose an ambush, night attacks were entirely out of the question, and in wet weather the efficiency of the weapon was more than doubtful. A self-igniting mechanism, the Ger. wheel-lock, had been invented, some say, as early as 1520. (Very few wheel-locks, however, date from much before 1575, and it is doubtful if the earlier date is correct.) It consisted of a serrated wheel revolving in a pan which had a sliding cover and was filled with the priming powder. A fragment of iron pyrites was held in the jaws of the cock. When this was lowered into the uncovered pan, and the trigger pressed, the serrated wheel revolved, the pyrites gave a stream of sparks from its contact wheel, and the powder was thus fired. But the wheel-lock was expensive, clumsy, and required a powerful spring. This spring, if left cocked, tended to 'set down' and thereby render the weapon useless; for the art of making good spring steel had yet to be discovered. The wheel-lock (or rose-lock as it was sometimes called, probably from Fr. *roue*) was never common in England, and there is no trace of its ever having been manufactured here. Parallel in development to the wheel-lock is the *snaphanslock* (Sp., or Dutch, lock). It is similar in appearance to the conventional flintlock which later superseded it; the essential difference is that in a snaphance the pan has a sliding cover similar to the wheel-lock, while the frizzen or steel on which the flint or pyrites strikes in the jaws of the cock is separate from the pan cover. The *dog-lock* is a modified form of the snaphance. It is similar in appearance to the conventional flint-lock, but has at the back of the hammer a large hook which engages it and acts as a half-cock. There were other locks based on very similar principles, some rather closer to the flint-lock, and some designed for countries where flint was rare and which required the use of a small flake of flint or pyrites in place of the usual heavy firestone.

By 1600 the private possession of F. was very common, and pistols and birding pieces and similar forms of light weapons were within the provenance of the ordinary citizen and middle-class person. But very few arms were made in England, because Eng. iron was at that time not sufficiently pure. Both iron and steel for gun-making had to be imported from the Continent, and weapons were generally imported in the partly-finished state and completed over here. The Low Countries were the main source of supply; but the better-class material came from Italy, and it is probable that we must look to Italy for most of the technical improvements which occurred in the *manuf.* of F. at this period. When the outbreak of civil war in England became certain there were practically no serviceable F. in the country. Those which had been used by the levies at the time of the Armada were now hanging in the churches and had not been put into condition since. Supplies were hastily sought by both sides, and

Holland and the N. provs. supplied the E. coos. with a large number of dog-locks.

Flintlocks.—All the above arms suffered from the same disability, in that they had no half-cock on the hammer. Further, the trigger mechanism consisted of a pin which came through the lock plate and secured the spur upon the face of the cock, or in a similar manner engaged laterally in an internal tumbler. This horizontal sear is a manifest source of weakness, although it endured in Sp. and Moorish arms up to the 19th cent.; but it was superseded entirely by the evolution of the normal flintlock, which dates from about 1640 and is probably of It. origin. In the true flintlock the sear simply engages in notches upon the tumbler of the hammer or cock, and it acts vertically and securely, so that 2 notches (1 for half-cock and 1 for full-cock) are all that is essential for a simple, reliable, and firm mechanism. By 1650 it can be said that, with the exception of a few Mediterranean arms of other design, the normal flintlock had completely superseded every other form of lock. It endured, with only detail variations and improvements, until superseded by the percussion lock about 1825. While the true flintlock was in use on cavalry pistols and carbines during and after the Civil war, rearmament, so far as the regular army was concerned, did not actually take place until the 1680's, when the old matchlocks and doglocks of the Cromwellian era were superseded by the traditional Brown Bess flintlock (*see* BROWN BESS). There does not appear to have been a rapid changeover, for during the Williamite wars in Ireland the older types were always referred to as 'King's Arms' and the new Brown Bess as 'The Queen's Arms.'

The craft of gun-making developed just before and during the Restoration and became a very successful trade. The improvement in Birmingham irons led to the invasion of the London market by Birmingham-made guns which were, although not of good quality, suitable for export trade to the Guineas, Africa, and to America. From 1660 to 1690 the quality of really high-class arms supplied by the Brit. makers was as good as anything which could be found in Europe. The rigid system of proof then in force was a very decided protection to the trade and to the purchaser. The sporting guns of the period were usually single-barrelled, rather long, and, to our minds, heavy and ill-balanced; but very little was done in the way of shooting game on the wing (*see* SHOOTING). Double-barrelled pistols and guns were fairly common but never very popular, because the double-barrel, side-by-side flintlock is wide at the breech and clumsy to handle. The under-and-over type, which had been the earliest double-barrel to become popular, had an unfortunate habit of shaking loose upon its central pivot, and disappeared completely about 1655. From 1690 to 1780 there was practically no change in F. The steel ramrod was substituted for the wooden one, and there were small changes of

fashion in decoration, but no material alteration in design or mechanism. About 1780 an increase of interest in shooting and the desire for more accuracy in pistols (*see* PISTOL) than was capable with conventional horse-pistols of the period led to decided improvements. Attention begins to be paid to matters of quick lock-action and good balance in the hand, both for sporting weapons and pistols. The evolution of the duelling pistol is now beginning. By 1800 the private weapon had become as near perfection as it was possible to achieve in the flintlock period. Such masters as Egg and Manton had reduced the cumbersome weapons of the past to a close-fitting, well-balanced weapon hardly inferior to the best designs of to-day. But the flintlock was never reliable in wet or windy weather, and it was quite possible to miss 2 shots out of 3 if the weather was inclement.

The Detonating System.—In 1810 the Reverend Forsyth took out his patent for the detonating lock. This substituted the use of a detonating compound that exploded by a blow for the old system of ignition by spark from flint or pyrites. Though fulminates and chlorates had long been known and had been used as priming powders, Forsyth was the first to confine the ignition and produce a controlled detonation. By 1820 various forms of detonators had been tried and design had steadied down to the conventional percussion cap (*see* PERCUSSION CAPS), which was a simple capsule fitted upon a nipple. Its invention was claimed by Col. Hawker and sev. others; but there is no certainty as to the true inventor, and it may have evolved from the ideas of sev. contemporaries. The superiority of the detonating system was manifest. It was almost waterproof; it did away with the necessity of priming; and it reduced the amount of powder necessary, because none of the powder gases escaped through the touch-hole. It took some time for the public and the gunmakers of the period to realise that a smaller charge was effective in the detonating gun. It was, however, very simple to convert existing flintlocks to the new percussion system, and by 1835 the flintlock was becoming a rarity in the private field, although it was still the official weapon of the army. The first percussion rifle (*see* RIFLE) issued to the Brit. Army was the Enfield of 1842. Nevertheless, the issue was very slow, and during the Crimean War many of our troops still used the old Brown Bess flintlock in addition to, or in support of, the limited number of Enfield and Minié rifles (*see* MINIE) in use.

Breech- and Magazine-Loading Rifles.—Both the principles of breech-loading and of magazine or repeating F. are as old as practicable F. themselves. They were tried out in matchlock and in flintlock days, but they were never effective because there was no means of controlling the explosive gas from the powder. Breech actions could not be made sufficiently close-fitting to stop the escape

of the gases, and experimental weapons were very soon rendered useless. Development of the practical breech-loader only became possible after the invention of the percussion cap. Many people tried to combine the percussion cap, or some similar form of ignition, with a reliable form of cartridge (q.v.). Until the cartridge was achieved no breech-loaders were successful. The Prussian needle gun was the first of practical military breech-loaders. This was adopted in 1848 and was used in successful wars waged by Prussia against the Danes in 1864 and the Austrians in 1866. Crude as the original needle gun was, its military efficiency was so remarkably demonstrated that all observers pressed their govts. for the immediate adoption of some form of breech-loading weapon. Most nations were content to convert a large proportion of their existing arms to some form of breech-loading. In Britain the Snider mechanism was adopted, by which a simple form of block breech was adapted to the muzzle-loading Enfield. This was not entirely a success with paper cartridges, similar to those used in shotguns to-day, but proved perfectly effective when a rolled metal cartridge was devised by Col. Boxer in 1867. This, however, was a temporary measure and complete rearmament was necessary. In 1871 the Martini-Henry single-loading rifle (see MARTINI, FREDERIC) was adopted, and the calibre of the projectile reduced from the old standard bore of .577 in. to a cylindrical bullet of .45 in. This was the last of the black powder rifles, for within the last 2 decades of the 19th cent. the development of reliable smokeless powder took place. Smokeless powder had been in use for shotgun cartridges for a considerable time before it was adapted successfully to military use. There is a very considerable difference between the powder suitable for a shotgun and that suitable for a rifle cartridge. Successful and popular smokeless powders for shotguns had been evolved by the late 70's, and it is doubtful if by 1900 black powder was widely used.

While the actual shot velocities given by smokeless powders to-day are not in any way better than those which can be achieved with black powder, smokeless is infinitely preferable, for there is less recoil and a great deal more cleanliness. Reduction of recoil is due to the fact that when firing black powder the weight of the discharge of smoke and unburnt material is added to that of the projectile. It amounts to a substantial proportion, and with smokeless powder, with practically no unburnt residue, the recoil is very much lighter. Any power armed with a magazine rifle of modern design using smokeless powder was in a military position of great strength against any nation not so armed. Continental powers adopted various models of the Mauser and Mannlicher (q.v.) rifles, and in England the Lee-Metford was designed. It was issued in 1889 and was later modified in 1899 to the Lee-Enfield. Thus the turn

of the century shows all the great powers armed with magazine rifles of relatively small bore, about .30, and with a range of double any of the old black-powder rifles and a rapidity of action which had not before been thought possible. With the small bore and 'all metallic' cartridge case for military rifles, machine-guns, which had hitherto been unreliable, now became practicable, and the Maxim gun and other automatic principles were adopted to a more or less standard degree by various powers. The Boer War was the first in which the new rifles were practically tested, and results showed that the new small calibre was in effect as good as the old heavy, black-powder projectile. It was equally effective as a killer; but it rendered wounds less dangerous, thereby conforming with the requirements of the Geneva Convention.

Automatic Pistols.—It was also at the turn of the 19th cent. that the first automatic pistols were introduced. The Mauser and Borchardt Luger were used to a limited extent during the Boer War, and the Ger. official pistol, known as the Luger or Parabellum, has the official date of 1908. With minor changes in the type of propellant used, and in some details of the projectile, this cartridge is that known as the 'nine millimetre' in the Brit. Army and is the standard for Sten, sub-machine-gun, and a wide range of other automatic and semi-automatic weapons. The term 'automatic' is strictly applicable to weapons that continue firing so long as the trigger is kept depressed; in weapons where the trigger has to be pressed for each consecutive shot, as is common with most, the term 'self-loader' is preferable. But the word 'automatic' has been used of both kinds for 50 years. The self-loading pistol was not a practicable weapon until the evolution of cartridges, which were miniature versions of the military cartridges of the period, containing smokeless powder and a nickel- or steel-covered projectile. Black powder, with its fouling and its relatively large bulk, was unsuitable as a propellant for the automatic arm. The soft lead projectile of a revolver cartridge is of no use in an automatic pistol cartridge, which requires a hard, metallic-cased bullet which can be held in the case with firmness and rigidity.

Sporting Guns, 1860-1900.—During this period the shotgun had undergone a great deal of development. It had changed from the ordinary muzzle-loading, double-barrelled, hammer gun to a hammerless, self-ejecting, and, in some cases, single-triggered weapon. After an early and complicated experimental period, design steadied down until it was practically the same in essentials as to-day. The only important modification was one of ballistics (q.v.): the principle of choke-boring became understood and was no longer purely a matter of chance. Steel barrels replaced the old figured Damascus and iron barrels, but it is doubtful if they had any effect upon the shooting. On the other hand, they were easier to work, and

many of the cheaper varieties were more reliable than their equivalent predecessors. Black-powder sporting rifles were not so easily adapted to smokeless powder, nor was the Brit. military propellant, cordite, more suitable. The early cordite deteriorated rapidly under hot and tropical conditions, and gave extremely variable pressures which involved great differences in shooting. Sporting versions of the normal military bolt-action rifles, such as the Mauser or the Mannlicher, became popular for medium game, and it was soon found that they could be fitted with heavier barrels for larger calibre cartridges suitable for dangerous game. These magazine rifles, although slightly slower for a second shot than a good double-barrel, weighed only half as much and cost about a quarter of the price of a double-barrelled rifle. They soon superseded the old double expresses.

Firearms Development, 1900-1918.—The Boer War had demonstrated 2 things: (1) the futility and inaccuracy of the cavalry carbine; and (2) that the clip-loading system, as shown by the Ger. Mausers used by the Boers, was far more efficient than the method of pushing cartridges one by one into the magazine of the Lee-Enfield. It was therefore decided to have 1 model rifle, the standard for both infantry, cavalry, and all branches of the service. To this end, the barrel was shortened and fully encased in wood. Charger or clip-loading was adapted, 2 clips being used to fill the magazine; but unfortunately the old rimmed cartridge, as distinct from the nearly universal rimless cartridge, was retained. This rifle was the S.M.L.E. (short model Lee-Enfield); and with various minor modifications, this was the weapon with which Great Britain entered the war in 1914 and again in 1939. The First World War witnessed the development of light machine-guns, e.g. the Lewis. Hand grenades, which had not been used since the early 18th cent., were introduced for trench warfare, as were many rifle grenades propelled from a cup screwed to the end of the rifle barrel. In 1918, the Germans introduced a few of the Bergmann Karbines. This is a short, self-loading carbine which fired a magazine containing some 30 rounds of Ger. automatic pistol ammunition. It is the forerunner of all sub-machine-guns, and

Prior to 1915 it was the duty of every officer to equip himself with a revolver which was his own personal possession and could be of any type or make so long as it took the standard .455 ammunition of the service issue. From 1915 onwards, when the new armies were taking the field, revolvers were manufactured at, and issued to them by, Enfield, and the Webley revolver ceased to be the usual Brit. officer's weapon which it had been since the 1880's; but the Webley .455 self-loading pistol, which is a special issue to the Navy, was retained in service.

Inter-war Developments.—During the inter-war period, about 1923, great atten-

tion was paid to streamlining of bullets, and the pointed bullet, or Mark VII, was introduced. This was followed later by a boat-tailed version, intended for long-range machine-gun fire and known as the Mark VIII. It was not a particularly stable bullet, and was not manufactured after the first years of the Second World War. Another remarkable change of the inter-war period was the substitution of .380 Enfield revolver for the older .455, in order to reduce weight. The cartridge for this revolver was an almost exact replica of what is known as the .38 Smith and Wesson, which dates back to about 1870, and was a favourite cartridge for medium-sized pocket pistols but quite unsuitable for warfare. Between the First and Second World Wars many developments took place in armour, and particularly in the provision of light armoured vehicles for troops. While few detailed changes had been made in the infantryman's rifle, many, and in some cases extremely useful, supplementary weapons had been devised. The Brit. had added to their list the .55 Boys rifle, nominally an anti-tank weapon but really quite useless. It was a heavy, single-shot, bolt-action affair, very much like the early Mauser rifles of relatively similar calibre which were produced by the Germans during the First World War as anti-tank weapons. Of greater interest was the Polish and Ger. system, in which tungsten carbide was used as the internal core of a small-calibre bullet of about .30. This was, however, backed by a 13 mm. cartridge which was necked down to take the minute bullet, and it was capable of piercing a large number of the lightly armoured tanks of the early period of the war.

The Second World War.—Whereas between 1914 and 1918 there were relatively few changes in ordinary small arms or even in machine-guns, the Second World War gave rise to a bewildering number of different weapons. Practically every nation concerned had already provided itself with some form of light automatic rifle or possibly a light machine-gun—the distinction between them is sometimes rather difficult to decide. During the course of the war about 44 different types of machine carbine or sub-machine-gun were evolved. Of these, 25 fired the old Luger Parabellum 9 mm. cartridge, which are used in the Sten. Ten, including those preferred by the Russians, fired the old Mauser 7.63 cartridge of practically equivalent date. Seven, all American, used the .45 in. cartridge popularised by the Colt automatic pistol of similar calibre, and 2 were the peculiar 8 mm. cartridge used only by the Japanese. The pre-war rifles, sub-machine-guns, and other novelties were all what may be called properly engineered and machined weapons, made as rifles always had been, i.e. under machining systems which were rigidly controlled by inspection and were first-class engineering work. This class of material cannot, of course, be turned out in

quantity in time of war, when material is restricted and when supplies of all sorts of essential small parts are restricted or unobtainable. So very early in the war we find a complete change in arms manu. It can be detected in the early models of the Sten gun, which were hurriedly put together at Enfield after the retreat from Dunkirk. It was a rough job of spot-welding, very poor machining and stampings, and suggestive of a cheap toy. Nevertheless it would fire, however unreliably in its early stages. Under the same tremendous urgency of need for weapons, Britain produced the No. 4 rifle, which was simply a modified Lee-Enfield in which a large number of awkward parts (special screw threads of no great importance) had been modified so that the ordinary manufacturer could turn out components without the rifle having to be completely made and finished at Enfield. In Germany some remarkable devices appeared. The Ger. Army used something like half a dozen automatic rifles of various types, and special ranges of light machine-guns, some for the Luftwaffe, some for the ground troops. Full use was also made of such techniques as spot-welding, rough stampings for those portions of the rifle which were not subjected to extreme stress, and die-castings of light metal for parachutists' weapons. Left-handed bolts, too, were preferred by the Germans. They found it no more difficult to train men to work a left-handed than a right-handed bolt, provided the weapon was automatic in action. In the last stages of the war the Germans attempted to arm the Volkswehr with almost any form of rifle which could be hastily manufactured. They succeeded in turning out an amazing number of extremely crude rifles, which were, however, both practical and accurate. Their potential value, on the other hand, was negated by lack of ammunition, thanks to the effectiveness of Allied air operations.

If we consider the advances in F. made from the time of the Boer War to that of the Second World War, we find that the huge mechanised armies of to-day tend to rely upon vol. of fire rather than upon the old-fashioned skilled and accurately aimed musketry. The poorest shot can spray bullets from an automatic weapon with some prospect of either hitting his adversary or at least of forcing him to keep his head down. The advantage, however, is achieved at the cost of an enormous supply of ammunition, and of all that its production and transport involves.

Modern British Gun Trade.—The Brit. gun trade has dwindled considerably since the closing years of the 19th cent. Many old-estab. firms are amalgamating or going out of business. To some extent this may be due to the restrictive effect of the various F. acts, but above all to economic changes which have rendered hand-work so expensive. So far as shot-guns are concerned, no mechanically made weapon, however good, can compete in

balance, feel, and general smoothness of action with a good hand-made and hand-finished piece. It is not easy to obtain craftsmen able to carry out the old-fashioned and highly skilled operations necessary for the production of a perfect gun. It is also to be regretted that during the last 50 years many overseas markets have been lost to Brit. manufacturers, who can no longer compete with the cheap machine-made produce of Germany, Belgium, and North America. Few firms have been able to instal machinery which would enable them to keep pace with continental makers; and the few which have been able to afford the necessary equipment have been ultra-conservative in their design. Another factor has been the disappearance of the small private firms of cartridge makers. Shortly after the First World War they were amalgamated or absorbed into a single combine under the aegis of Nobels Explosives, which in turn has become a dept of Imperial Chemical Industries, so that there is practically no competition in Britain. Moreover, in the U.S.A., and in most European countries, all primers and the '22' rim-fire ammunition are charged with anti-corrosive priming composition. These have now been in use for some 25 years and are practically standard, but were only belatedly adopted in Britain.

Firearms of To-day and To-morrow.—The military rifle of the present and the immediate future is the light semi-automatic weapon. Some of these were largely used in the Second World War. The Americans carried the 'Garrand,' a weapon which was by no means wholly successful; and to a certain extent they replaced the traditional 'Colt' pistol, carried as a sidearm, by the issue of the new automatic carbine of .30 calibre. In the course of the war the Germans introduced a remarkable innovation by cutting down the length of their rifle cartridge to about half. They retained the same calibre of bullet, but it was a shorter and lighter projectile. In the same way, the propellant load was reduced to about half. This new cartridge was, for all practical purposes, just as good at any normal battle range as its much larger predecessor. It had the further advantage that it saved an enormous amount of unnecessary waste of metal and packaging. Many designs were submitted for the new rifle which was to be used by Americans, Brit., and all W. nations alike. Our almost traditional .303 has been abated to .30, and the design produced by the F.N. Company of Liège adopted as standard for troops. Similarly, the 9-mm. Sten gun has been replaced by a new and totally redesigned model based upon the Australian Patchett type; and the adoption of the new .30 rimless cartridge greatly simplifies matters of light machine-guns and self-loading weapons of all kinds. Though the revolver is still in service, it is inevitably obsolescent and has, so far as the Canadian Army is concerned, been replaced by a 9 mm. type of 'Browning' pistol (see BROWNING, JOHN MOSTE),

which is manufactured in Canada. It is probable that this, or something very similar, will in time become the official pistol for the Brit. Forces. On the other hand, the pistol may completely disappear as a military weapon, yielding place to the new types of automatic carbine. While this enormous development of self-loading and automatic weapons means that a vast vol. of fire can be deployed by a relatively small body of men, at the same time it introduces special problems of its own. The question of barrel wear is one which is always important in machine-guns, and it is doubtful if there is any particular advantage or likelihood of the present cyclic rate of fire being exceeded. Electric ignition slightly improves the rate of fire of most machine-guns; it was used for the 13 mm. and even larger sizes of aeroplane-mounted machine-guns by the Germans during the Second World War. It is not, however, a system which can be usefully applied to operational machine-guns in the field. As regards sporting rifles, modern ballistic science has greatly extended the initial velocities of many well-known cartridges, as well as introducing other specialised cartridges for small and medium game. These latter cartridges are greatly favoured in America, where it is held that a small bullet travelling at an extremely high velocity has the killing power of a large bullet at a much lower velocity. This opinion is far less widely held in Africa where the game is not only heavier but a great deal more dangerous. There the tendency is to retain the old-fashioned larger calibres which are known to be thoroughly effective. The practical advantage of these very high velocities is that no adjustment of sights is necessary for any normal sporting range, but there is a disadvantage in that a very light bullet travelling at extreme velocity is likely to break up on contact with the animal and to develop its energy without penetrating far. The result is sometimes an unpleasantly wounded animal and a failure to kill where the use of a heavier and slower projectile would certainly have been fatal. Muzzle velocities in the neighbourhood of 4000 ft per sec. as against that of the medium game rifle (about 2000 ft per sec.) are claimed for some of the newer Amer. cartridges, but little is yet really known about their game-killing power in practical use. In the same way, some of the newer Amer. pistols are made to take a cartridge called the .357 magnum. This has a muzzle velocity in the neighbourhood of 1400 ft per sec., nearly double that of the normal pocket revolver of equivalent calibre. The result is greatly increased striking power, but this is only achieved at the expense of a punishing recoil and extremely expensive ammunition. In many Amer. pistols the weight of the frame has been reduced by about $\frac{1}{4}$ by the use of special light alloys; but this lightening of weapons makes the recoil far more severe. In general, the modern tendency is rather

towards simplification of machining processes, much closer precision gauging than was usual in the past, and improved methods of manuf. Modern advances in metallurgy have greatly simplified a number of processes which used to be relatively expensive and dependent upon hand work; and while it remains uncertain whether the ordinary user of F. will benefit much from the use of light alloys and die-castings, these will doubtless be of some use to specialised troops such as paratroopers, with whom considerations of weight are of greater importance. It is unlikely that the ordinary standard patterns of weapons as we know them to-day will be altered until some revolutionary change occurs in the field of propellants. Just as black powder, which had held the field for centuries, was superseded by the nitro-cellulose propellants, so these in their turn will yield to new discoveries; but so far nothing is known which is likely to take their place at an economic price. See H. B. C. Pollard, *History of Firearms*, 1926; H. C. Logan, *Hand Cannon to Automatic*, 1944. See also ARTILLERY; EXPLOSIVES; GUN; HOWITZER; REVOLVER; RIFLE.

Fireball, name of one or two kinds of firework, formerly used in war for illuminating or incendiary purposes. Of these the ground F. consisted of a sack filled with some brightly burning composition, and pierced with holes. A parachute F. was constructed in a similar manner, but was timed with a fuse and supported by a parachute. Both were fired from a mortar. They are now superseded by rockets (q.v.). The name F. is also applied to a certain class of comet, and also to a variety of globe lightning. See A. St H. Brock, *A History of Fireworks*, 1949.

Firebote, term in law used to denote a tenant's right to cut wood for fuel from the land on which he is living. See ESTOVERS.

Firebrick, see FIRECLAYS.

Fireclays are clays which will withstand a high degree of heat without excessive shrinking or warping. The varieties of F. differ in their degrees of fusibility owing to the variations in the proportions of free and combined silicon; they are essentially hydrated aluminous silicates with lime and magnesia in the form of carbonates, iron pyrites, free silica, potash, and soda, with a percentage of water. No fixed standard of refractoriness can be given, but in all good F. the fusion point is over 1600° C. Such materials as ganister, sand, sawdust, etc., are mixed up with F. before burning to ensure the 'body' of the brick being sufficiently open in character. Ordinary F. are used for making bricks, crucibles, chimney-pipes, etc., but when special properties are required in the bricks such materials as lime, bauxite, etc., are added. Fireclay is found in conjunction with coal at Stourbridge, Glasgow, Newcastle-on-Tyne, and many other places in the Brit. Isles. It is also found in Germany, France, Belgium, the U.S.A., etc.; the beds do not as a rule exceed 2 ft

in thickness. The Stourbridge F. are world-famous, and widely exported.

Firedamp, the name applied by miners to methane (CH_4) (q.v.). It comes from the crevices in the mines, being formed in the coal, and when mixed with the air in a certain proportion is highly explosive, causing many accidents. See **COAL-MINING**.

Firefighting, see **FIRE BRIGADES AND FIRE-FIGHTING**.

Fireflash, air-to-air guided weapon, carried as part of the armament of a piloted aircraft and propelled to supersonic speed by solid-fuel rockets. The warhead is proximity fused and designed to explode as soon as the weapon is within lethal range. F. was the first guided weapon to be delivered to the R.A.F.

Firefly, name given to the luminous beetles belonging to the Lampyridae and the Elateridae. The former family include the true glow-worm (q.v.), the Eng. species being *Lampyrus noctiluca*. Little is known as to the light given by the Lampyridae, but most entomologists agree that it has a sexual significance; in the *Luciola*, F. of S. Europe, this brilliance is almost entirely confined to the male. To the Elateridae belong the genus *Pyrophorus*, tropical Amer. beetles, some of whom possess remarkable luminosity; *P. noctilucus* has a yellowish eye-like lamp on each side of the thorax, and another on the ventral surface of the abdomen. These beetles are used by the natives as lanterns, and the women ornament their hair with them.

Firelock, see **FIREARMS**.

Firenze, see **FLORENCE**.

Firenzuola, **Agnolo** (1493-c. 1545), It. author, b. Florence. He at first entered the legal profession, and practised in Rome, where he was the friend of Aretino. It is said that he joined the order of monks at Vallombrosa, and after the death of Pope Clement VII he became abbot of Prato. Among his works are: *Discorsi degli animali*, a satire on court life, 1541, 2 comedies, *I Lucidi* and *La Trinzuzia*, 1549, and a trans. of the *Golden Ass* of Apuleius. His works were first collected and pub. by P. L. Fantini in 1802. See life by M. Olivieri, 1935.

Fireweed, see **EPILOBUM**.

Fireworks, see **PYROTECHNICS**.

Firmament, name applied to the vault of Heaven, the Vulgate trans. *Firmamentum* being the rendering of the Septuagint *stereoma*, the idea in Hebrew being that of something stretched out. The F. was originally looked upon as a solid sphere, which revolved and carried with it the stars which were fixed to it—also forming the div. between the 'waters above the firmament' and those below it.

Firmân, or **Firmaun**, term applied to a decree issued by the sultans of Turkey. Any minister could sign such a decree, but a special one had to make it effective by placing on it the name of the sultan in a monogram.

Firmium Julium, see **MOTRIL**.

Firmont, **De**, see **EDGEWORTH, HENRY**.

Firn, see **NÉVÉ**.

Firozshahr, vil. in the dist. of Firozpur, W. Punjab, Pakistan. It is now very close to the boundary between India and Pakistan. It was the scene of a battle which took place in 1845, when the Brit. under Sir Hugh Gough, and Sir Henry Hardinge defeated the Sikhs.

First Aid, term used for assistance given immediately in cases of accident or sudden illness before medical advice can be obtained. A knowledge of a few simple rules about stopping bleeding, etc., is often the means of saving life. Lessons in F. A. methods and principles are given to both men and women by the St John Ambulance Association (St John's Gate, Clerkenwell, London, E.C.), the Brit. Red Cross Society (14 Grosvenor Crescent, London, S.W.), the St. Andrew's Ambulance Association (a Scottish organisation), and boy scout and girl guide organisations. See **ANTIDOTES**; **BANDAGES**; **BLEEDING**; **BRUISES**; **BURNS AND SCALDS**; **CHOKING**; **CONCUSSION OF THE BRAIN**; **CONVULSIONS**; **DISLOCATION**; **DROWNING**; **EPILEPSY**; **EYE**; **FAINTING**; **FIT**; **FRacture**; **Hysteria**; **POISON**; **SHOCK**; **SPRAIN**; **SUN-STROKE**.

First Empire, that of Napoleon I, who was created emperor of the Fr. by a decree of the Senate on 18 May 1804. The E. lasted until the restoration of the Bourbons in 1814.

First-fruits, first profits of any office, property, etc., as e.g. in feudal tenure, the year's profit of the land after the death of the tenant, which was payable to the king; and, in eccles. law, the first year's income of a benefice. When the papal power was dominant, each new incumbent had to remit to the papal treasury the first year's revenues (*primities*) of his benefice. Valuations of annates were made in England in the 13th cent. and probably originated about that time. By the Annates Acts of 1532 and 1534 payment of F. to the pope was forbidden, and they were appropriated to the crown. Their valuation was recorded in the *Valor Ecclesiasticus* in 1535 and became the basis of the valuation of the Eng. clergy thereafter. In Queen Anne's reign these annates were given up to a fund for augmenting poor livings, known as Queen Anne's Bounty.

First of June, Battle of the. The name given to the naval victory of Lord Howe over the Fr. which was fought off Ushant and terminated on 1 June 1794. This was the first occasion on which the Fr. naval strength in the Channel had been encountered in the Napoleonic Wars, and the victory was important in its results both in destroying Fr. naval activity in the Channel and in depriving them of a large quantity of grain which was under convoy from America. The number of ships on either side was about equal, and the fight was hotly contested; but though it is always referred to as the 'glorious' First of June, no remarkable evidence of naval skill was given. The result, however, was fairly decisive, for the Fr. adm. lost 7 ships, and 3000 men, and was compelled to seek refuge in Brest.

First Offenders. In order to mitigate the harshness of the criminal law the First Offenders Act, 1887, gave courts the power in certain cases to place F. O. on probation instead of committing them to prison. The probation system was extended by the Probation of Offenders Act, 1907 (repealed by the Criminal Justice Act, 1948). The Criminal Justice Act, 1925, provided for the appointment of probation officers. The present law relating to the probation of O. is contained in the Criminal Justice Act, 1948. See CRIMINAL LAW.

First Republic, proclaimed in France on 21 Sept. 1792 by the National Convention (q.v.), following the downfall of the Bourbons in the Fr. Revolution. The Convention was succeeded by the Directory (q.v.) in 1795 and by the Consulate in 1799. The R. ended with the estab. of the First Empire (q.v.).

Firth, Sir Charles Harding (1857-1936), historian, b. Sheffield, and educ. at Clifton and Balliol College, Oxford. F. was lecturer at Pembroke College, 1887-93; Ford lecturer in Eng. hist. in the univ. of Oxford, 1900; fellow of All Souls', 1901, of the Brit. Academy, 1903, of Oriel, 1904. In 1904 he was appointed regius prof. of modern hist. at Oxford. F. followed in the tradition of S. R. Gardiner, like him, devoting his prin. studies to the Civil war period. His works include: *Scotland and the Commonwealth*, 1895, *Journal of Joachim Hane*, 1898, *Scotland and the Protectorate*, 1899, *Oliver Cromwell*, 1900, *Cromwell's Army*, . . . 1901, *The House of Lords during the Civil War*, 1910, eds. of *Lives of Col. Hutchinson*, 1885, and the duke of Newcastle, 1886, Ludlow's *Memoirs*, 1894, and *The Clarke Papers*, 1891-1901. He also contributed to the *Dictionary of National Biography*. He was knighted in 1922.

Firth, Mark (1819-80), philanthropist and steel manufacturer, was a native of Sheffield. In 1843 he estab. in Sheffield his own steelworks, which grew rapidly in size and importance, and where eventually most of the steel ordnance came to be manufactured. As a philanthropist he figures as the donor of a park (opened in 1875), Firth College (founded in 1879), and almshouses, all of which gifts were bestowed on Sheffield.

Firth (Icelandic *fjörð*, Eng. *frith*), Scottish name applied to a narrow arm of the sea, e.g. Firth Bay, a shallow inlet 6 m. from Kirkwall, etc. It is frequently a riv. estuary, as the F. of Forth and the F. of Clyde.

Fisc, see FISCUS.

Fiscal, see PROCURATOR FISCAL.

Fischart Johann, known as *Mentzer* (Mainzer) (c. 1546-c. 1590), Ger. satirist, b. Strasburg. He took the degree of doctor of the univ. of Basel about 1572, and after travelling in France and England went to Strasburg about 1576, and in 1581 became advocate to the imperial court at Speyer. After his marriage he became magistrate or bailiff at Forbach, near Saarbrücken, 1583. His works, the greater number of which were written between 1575 and 1581, are many of them

clever satires directed against the pope, the Jesuits, the aristocracy, and all sorts of folly. They are mainly based on the model of Rabelais, but at the same time are characterised by a true originality. In addition to these satires there are many works which are purely humorous, and which assure to him one of the highest places among Ger. humorists. He was a master of his own language, which fact is exemplified very clearly in his prin. work, *Geschichtsklitterung, or Affentourliche Geschichtsschrift von . . . Gargantua und Pantagruel*, 1575, a free adaptation of Rabelais's *Gargantua*, full of the most masterly play on words. Other satires include: *Aller Praktik Grossmutter*, 1572, *Podagrammisch Trostbüchlein*, 1577, and *Bienenkorb des heiligen römischen Immenschwarms*, 1579, while *Flöhzhatz*, 1573, and *Weiber Tratz*, 1573, are among his humorous work. He also wrote *Das glückhafte Schiff von Zürich*, 1576. See *Lives* by C. H. W. Wacknerhagl, 1870, and A. Hauffen, 1921-2.

Fischer, Emil Hermann (1852-1919), Ger. organic chemist, b. Euskirchen. Studied at Bonn and Strasburg and, after some years as assistant to von Bayer in Munich, became prof. of chem., first at Erlangen and then at Würzburg. Later he succeeded von Hoffmann as prof. of chem. at Berlin, and during his tenure the school fl. so that students came to it from all parts of the world. He became famous for the preparation in conjunction with Julius Tüfel of synthetic sugars and from these of the ferments and enzymes. His work on proteins was, however, his prin. achievement. His other researches included the analysis of the constitution of the rosaniline dyestuffs, investigation of uric acid, and the preparation of purin and its derivatives. The value of his work in organic chem. was recognised in most countries; in 1890 he was awarded the Davy Medal of the Royal Society; and in 1902 the Nobel prize for chem.

Fischer, Ernest Kuno Berthold (1824-1907), Ger. philosopher, b. Sandewalde, Silesia; educ. at Leipzig and Halle Univs. He became a lecturer at Heidelberg, and in 1856 prof. of philosophy at Jena until 1872, when he succeeded Zeller at Heidelberg. His chief work is *Geschichte der neuern Philosophie*, 1854-1910. See studies by E. Traumann, 1907, and E. Hoffmann, 1924.

Fischer, Hans (1881-1945), Ger. chemist, b. Höchst. He was educ. at Lausanne, Marburg, and München, and later held various professional appointments in Vienna, Innsbruck, and Munich. In 1930 he received the Nobel prize in chem. for his work on the red colouring matter in blood.

Fischer, Johann Georg von (1816-97), Ger. poet and dramatist, b. Gross-Süssen, Württemberg. He studied literature and botany at Tübingen, in 1846 being appointed prof. at the Stuttgart Oberrealschule. His first vol. of poems, *Gedichte*, was pub. in 1854, and his last, *Mit Achtzig Jahren*, in 1896. He also wrote some dramas, among the best known being

Saul, 1862, and Kaiser Maximilian von Mexico, 1868.

Fischer-Tropsch Process, system of synthesising hydrocarbon waxes and oils from hydrogen and carbon-monoxide. It was invented in Germany by Franz Fischer and Hans Tropsch in 1925 and under the pressure of war preparation was developed intensively to produce liquid fuels. During the Second World War 9 plants produced a total ann. output of 500,000 tons of synthetic oil. In this process coal is converted into a gas mixture by high-temp. treatment. After purification it is subjected to a catalytic treatment in which 80 per cent of the gases is converted to the required products, generally olefine hydrocarbons and straight-chain paraffin. The compressed gas may be used as a raw material for chemical production or as a portable fuel. The motor spirit, provided it is reformed or combined with high-grade fuel, is suitable for petrol engines. Diesel oil of very high quality is another product; the wax is suitable for polishes, etc.; by further treatment of the primary products detergents, soap, fats, and lubricating oils may be produced. See FUELS.

Fischer Verlag, S., name of a leading publishing house in Germany, founded by Samuel F. (1859-1934) in Berlin, 1886. The firm was a great sponsor of literary naturalism, and pub. works by Gerhart Hauptmann, Thomas Mann, Hugo von Hofmannsthal, and Hermann Hesse. In 1890 the literary and political periodical *Die Neue Rundschau* was issued, which has successfully appeared ever since. A pocket-book series of classics and contemporary literature, as well as of general knowledge, was introduced in 1952, and in 1957 F. started publishing pocket encyclopaedias, which will eventually comprise 34 vols.

Fiscus, or **Fisc** (Lat. *fiscus*, a basket or money-bag), word used to denote the Rom. emperor's privy-purse as distinct from the *aerarium* or state treasury.

Fish, aquatic vertebrate breathing by means of gills and having fins supported by skeletal rods called fin-rays. F's have a definite brain and sense organs, including inner ears, each with 1, 2, or 3 semicircular canals. Thus defined, F's comprise the jawless *Cyclostomata* (and the fossil jawless F.s) and the jawed F.s, these being divisible into the cartilaginous F.s (see ELASMOBRANCHII) and the bony-F.s, Osteichthyes (see BONY-FISHES). See also TELEOSTII.

Fish, Royal. In Eng. law, certain fish (whales, sturgeons, porpoises, etc.), when taken in territorial waters, belong to the crown or its grantee, though caught by another person.

Fish Curing, term used to describe methods of preserving F. intended for distant markets or for consumption at a later date. This is usually done by salting, drying, or smoking. Of recent years the improved facilities of carriage and the use of refrigeration have made it unnecessary for F. to be cured for marketing in many cases where it was once

essential; but against this, the enterprise of merchants in various parts of the world has built up a demand in remote areas where previously little trade was done. The 2 chief varieties of F. thus treated are herrings and cod. Haddock is also cured, and Findon, near Aberdeen, has given its name to the well-known Finnan haddock. The last-named fish are usually dried, either split or treated whole. The F. curers of Iceland are especially well known for their skill in preserving cod, which enables it to be sent to very remote areas. Herring-C. is usually done by salting, the pickle being little more than the natural salt of the sea brine. A large demand exists for smoked herrings, and great care is taken in selecting the right kind of wood to be used for this purpose, as the flavour is very easily affected by the nature of the smoking. Around the Brit. seaboard many endeavours have been made to deal with the problems arising from the occasional unexpected glut of herrings. Where there is suitable warehouse accommodation, and a local pop. which is prepared to join in 'rush jobs,' as in some places on the Northumberland coast, large quantities of herrings are frequently cured with remarkable speed.

Fish-hawk, see OSPREY.

Fish-hooks. These, in very early times, were made of stone, bronze, copper, and sometimes shell, as has been revealed by relics belonging to a prehistoric era. In spite of their antiquity, however, some of them resemble very closely those of modern times, though some seem to have been quite original, such as those made of the spine of a cactus and used by Indians. The place in England where F. are principally made to-day is Redditch. They are usually composed of soft steel wire, afterwards hardened and polished, and may be manufactured either by hand or machinery. Their shapes differ, and the number of designs which are executed is considerable. The one most generally in use has the point parallel to the shaft, although some anglers prefer it bent in another direction. The ends also may be ringed, flattened, or simply plain.

Fish-lice, name generally applied to any of the copepod crustaceans which are parasitic on fishes; there are many genera and species, which are ectoparasitic, as *Caligus*, or epizoid.

Fish-oils are esters of glycerol with highly unsaturated fatty acids usually containing 20 or more carbon atoms. Many of them, e.g. cod-liver oil, sardine oil, seal oil, and whale oil, are of medicinal, nutritional, or industrial importance; thus whale oil is used in the manuf. of margarine and soap, for tempering steel, lubricating, and as a leather dressing.

Fish River, see GREAT FISH RIVER.

Fisher, Andrew (1862-1928), Australian statesman, b. Kilmarnock, Ayrshire, Scotland, son of Robert F. Worked in a coal-mine, and went to Queensland in 1885. Elected to Queensland legislature in 1893; minister of railways in Dawson administration. In 1901 he entered Commonwealth Parliament as Labour member

for Wide Bay. Joined Watson Labour Cabinet, 1904, as minister of trade and customs. Leader of party from 1907. In 1908 he was prime minister for 6 months and in 1910 was back in power. Privy councillor, 1911. The gov. fell, 1913; but he returned to power Aug. 1914. Resigned 1915 and became high commissioner in London, where he retired in 1921.

Fisher, Geoffrey Francis (1887-), churchman and schoolmaster, son of the Rev. H. F., rector of Higham-on-Hill, Nuneaton. Educ. Marlborough College, and Exeter College, Oxford; Liddon studentship, 1910; at Wells Theological College, 1911; assistant master, Marlborough College, 1911-14; headmaster of Repton School, 1914-32; bishop of Chester, 1932-1939; of London, 1939-45; dean of the Chapels Royal, 1939-45. Elected archbishop of Canterbury in succession to Wm Temple on 22 Jan. 1945, and enthroned 19 April.

Fisher, Herbert Albert Laurens (1865-1940), politician and historian, b. London, and educ. at Winchester, New College, Oxford, Paris, and Göttingen. He became a tutor and lecturer in modern hist. at Oxford; and was vice-chancellor of Sheffield Univ., 1912-16. After being elected Liberal M.P. for the Hallamshire Div. of Sheffield, 1916, he was appointed president of the board of education, and in that capacity he served until the fall of Lloyd George's 2nd coalition gov. in 1922. From 1918 to 1926 he sat in the Commons as National Liberal member for the Eng. Univs. As president of the board of education he was responsible for the far-reaching Education Act of 1918, which was framed 'with a view to the establishment of a national system of public education available for all persons capable of profiting thereby.' He left a lasting memorial in his masterly *History of Europe* (3 vols.), 1925, a work which gives him a place among the greatest European historians. Of his other works the more important are: *The Mediæval Empire*, 1898, *Studies in Napoleonic Statesmanship*, 1903, significant for its account of the emperor's reorganisation of Germany, *The Political History of England, 1485-1547*, 1906, and *Bonapartism*, 1908.

Fisher, John, St (c. 1459-1535), Eng. saint and bishop, b. Boverley, Yorks, and educ. at Cambridge, becoming master of Michaelhouse in 1497. The countess of Richmond, mother of Henry VII, made him her confessor. In 1503 he became first Lady Margaret prof. of divinity at Cambridge, and was appointed chancellor of the univ. and bishop of Rochester the following year. F. was a prominent humanist, and was responsible for inviting Erasmus to Cambridge, though in the question of Church reforms he was rather more conservative than fellow-humanists such as Colet, More, and Erasmus himself. He opposed Henry VIII's divorce from Catherine of Aragon, and in 1534 was sent to the Tower for refusing to swear to the Act of Succession. In 1535 he was beheaded on Tower Hill for refusing to

take the Oath of Supremacy. F. had been made a cardinal a month earlier; 400 years after his death he was canonised. See life by N. M. Wilby, 1929.

Fisher, Sir (Norman Fenwick) Warren (1879-1948), Brit. civil servant and public administrator, educ. at Winchester and Hertford College, Oxford. Entered the civil service by open competition 1903. On the retirement of Sir John (later Lord) Bradbury, he was appointed to the important office of permanent secretary to the Treasury, being singled out by Lloyd George as the right man to introduce progressive methods in the organisation of the civil service. F. at once recast the Treasury estab. by placing the 3 chief branches, finance, supplies, and estab., under separate controllers ranking as heads of first-class gov. depts, with direct access to the Chancellor of the Exchequer. The permanent secretary, thus freed from much departmental routine, was formally recognised as 'head of the civil service'—a style that did not pass without a strong challenge in the Commons and outside the House. But as such he was entrusted with the duty of advising the prime minister on matters of common interest to the service, including especially the appointment of permanent heads of depts—a reform which secured an approach to a unified service in the higher ranks.

Fisher, Marten, see L'EKAN.

Fisher of Kilverstone, Sir John Arbuthnot Fisher, 1st Baron (1841-1920), adm., b. on the Wavenden estate, Ceylon. Entered the navy in 1854, and served in the Crimean war of 1855, and the China war of 1859-60; took part in capture of Canton and Pei-ho forts. In 1882, as commander of the *Inflectible*, he was present at the bombardment of Alexandria. He became director of naval ordnance, 1886, and served as such until 1891. Thereafter he received steady promotion, holding a number of commands, and was first sea lord of the Admiralty from 1904 until 1910. He was ennobled in 1909. During his term as first sea lord he introduced many reforms, including that of the nucleus crew, which rendered a peacetime navy rapidly available for war; the elimination of obsolete ships; and the substitution of the Dreadnought type. He is remembered as the man who, in 1910, predicted the date of the war with Germany and shaped his policy accordingly. Under many govts. he worked and planned with extraordinary success to provide an adequate fleet, and when the First World War broke out the Grand Fleet was in readiness to sail to the right location and thwart the enemy, which it did by going, at the psychological moment and without delay, to its war station at Scapa Flow. He retired from the Admiralty in Jan. 1910, and from the navy in 1911. In 1912 he was president of the royal commission on oil fuel and engines, and it was through the researches of this body that in 1913 the Admiralty launched the first oil-fired battleships of the *Queen Elizabeth* class and that the first light Brit. cruisers (*Arethusa* class) to burn

oil fuel were on the point of being commissioned when the war commenced. The *Arethusa* class certainly proved its value in the war, notably in the action off the bight of Heligoland. When the war commenced F. had been in retirement since the age of 70, though after that age he continued to exercise a very real influence on naval policy, and in particular his advice was sought by the gov. and followed in the handling of the Agadir incident (q.v.). When, in 1914, through prejudice and popular clamour, Prince Louis of Battenburg, later the 1st marquess of Milford Haven (q.v.) was driven to resign office, F. succeeded him as first sea lord, and at once ordered some 600 vessels of all classes, and in many cases of new design, to be completed by the early part of 1915. His ambitious plans, however, for the use of these ships were frustrated by the Dardanelles expedition, which was diametrically opposed to his naval policy of striking at the heart of Germany by a landing force, covered by the navy, on the coast of Pomerania. When he saw that ships were being gradually withdrawn from the North Sea forces to supply the needs of the Mediterranean forces, so that (in his opinion) Brit. control of the sea was in jeopardy, he tendered his resignation, and retired immediately after the coalition gov. came into office. But this did not mark the actual end of his services; his work in organising the Board of Invention and Research, a purely advisory body, which work he rendered on recall in 1915, was highly effective. He appears to have spoken in the House of Lords on 2 occasions only, and then only on matters arising out of the Dardanelles expedition. Laconic in the extreme, the first speech, following the resignation of Churchill from the cabinet in Nov. 1915, was by way of retort to Churchill's accusation that the first sea lord had not given clear guidance or firm support over the Dardanelles question. The second speech was in Mar. 1917, and was to much the same effect. Whatever his faults of impulsiveness and sailor-like bluntness—as exemplified by his famous phrase 'Sack the lot'—he was essentially the great organiser and administrator who created the modern Brit. Fleet and whose uncanny strategic prevision secured its efficiency and readiness for war. In 1919 he pub. 2 very characteristic books—*Records*, and *Memories*. From these the reader gets the impression that Cutcliffe Hyne's Capt. Kettle was drawn, in part at least, from F. He was buried in Westminster Abbey. His brother, Sir Frederic Wm F. (1851-1943) was also a naval officer. Served in the Mediterranean, 1887-91; in Australian service from 1894 to 1898. Promoted adm. 1907. President of the Royal Naval College, Greenwich, 1911-14.

Fisheries. (1) *River and Lake Fisheries*, are regarded in England as centres of sport and recreation. They are generally the right of the owner of the soil over which the water flows, and in the hands of private owners. It is divided into sev.

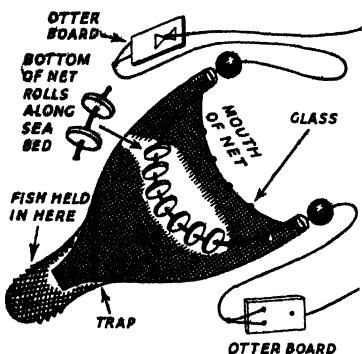
and common fishery. A sev. fishery is the exclusive property of the owner of the soil and can only be transferred by deed; should the right be unclaimed the public acquire no title by right of custom. If the course of a riv. is diverted, the late owner has no claim to the new channel. The owner of the soil has the right to all the fish he can take, and is not restricted in the use of machinery if that machinery does not disturb the navigation. He cannot put up an obstruction to fish, above or below the part under his control, neither may he use dynamite or any other explosive, nor pollute the riv. in any way. Common fishery is fishery which all persons may enjoy. The Crown has no right of fishery in non-tidal waters on a subject's property. The control of fresh-water F. is in the hands of dist. boards appointed by co. councils which regulate the by-laws and licences and fix the close time for the protection of fishing. There are special laws for salmon and fresh-water fishing. The prin. fresh-water fish are carp, barbel, tench, roach, bream, trout, salmon, and chub (qq.v.). The largest and most important lake fishery in the world is the Great Lakes fishery in the U.S.A., from which great quantities of food fish are obtained, including white-fish, trout, pike, and perch. Huge quantities of fish are obtained from the Mississippi R. The rivs. of Russia are well stocked with food fish, and carp, bream, lampreys, and sturgeon are extensively caught in the Ural and Volga rivs.

(2) *Sea Fisheries*.—The capture of fish as a food for man seems to have been carried on from very early times. Cave remains in W. Europe afford evidence of the use of many different kinds of implements for fishing and of the capture of a considerable variety of species, even including the whale. Dried and salted fish was an important article of commerce among antec peoples, and many great maritime cities, both antec and modern, had their origin in fishing vils. A herring fishery is known to have been estab. off the Eng. coast by the 8th cent., and a little later the Brit. fishing industry had extended all over the North Sea up to the Arctic regions. The industry was greatly assisted by the growth of Christianity, since the demand for fish for abstinence imposed by the Church, was considerable. In this country the Reformation dealt a severe blow to the F., and the Brit. supremacy in this direction was not regained till after the Napoleonic wars, having been held in the meantime by the Dutch. During the latter part of the 19th cent. the fishing industry throughout the civilised world received a great impetus from the introduction of steam. This first showed itself in the increased market for fish rendered possible by railway transit, and later spread to the methods of fishing themselves. Steam drifters and trawlers are now largely used, and by these means, and the introduction of ice as a preservative, fresh fish is sold at great distances inland. The regulation of the fishing industry has also been found

necessary, as many of the best grounds were becoming worked out owing to indiscriminate methods.

Methods of Fishing.—The numerous modes in which fish are captured all fall under 3 main heads: fishing by lines, nets, or traps. Fishing with a hooked line is of 3 varieties, known as the hand line, the small line, and the long line. Fishing by hand line is carried on off the E. and S. coasts of England for cod and whiting. It is only possible in shallow water near land, and the lines are single and bear 1 or more hooks. As each fish is caught the line is drawn up and the hooks rebaited.

Small-line fishing is the prin. method



Odhams Press

OTTER TRAWL-NET

Fish enter through the wide mouth, and are trapped once they pass through the narrow funnel into the bag.

employed in the Scottish haddock industry. It is carried on by small boats, known as yawls, within 2 or 3 m. of land. The lines range about 2000 fathoms, and are usually baited on land by the wives and children of the fishermen. Mussels form the usual bait, but limpets, scallops, cockles, lugworms, and crabs are also used. The hooks are attached to smoods about 4 ft apart, and the line, when ready, is coiled into a creel, the baited hooks all lying in the centre, and fresh grass scattered over them to keep the bait fresh. When the fishing ground is reached the lines, all fastened together, end to end, are run out over a metal cylinder. The ends are kept down by large stones, to which are also attached lines reaching to the surface, and there fastened to a buoyed flagstaff, weighted so as to float upright and mark the position. The line is shot across the tide, and is left at the bottom for from half an hr to an hr. Plaice, codlings, whittings, dabs, flounders, and gurnets are also caught by this method, though haddocks form the chief haul.

Long- or great-line fishing, also known as boulder or trot-fishing, follows the same principle as small-line fishing, but employs longer and stronger lines and larger hooks. It is largely used in the North Sea, by both Eng. and Scottish fishermen, at a considerable distance from land for the capture of large fish, such as cod, ling, coalfish, halibut, skate, rays, turbot, conger, and hake. Off the Scottish coast this mode of fishing is generally carried on by the herring boats, and herrings are used as bait. Off the Eng. coast large vessels with a sea-water well are used, in which the fish are kept alive. The Eng. long line is often about 8 m. long when shot, and carries over 4000 hooks; squid, whelks, herrings, and lampreys are used as bait. Steam vessels are now employed in long-line fishing, and are usually provided with an ice-chamber for storage. The Scottish North Sea long-line fishing is carried on mainly from Mar. to July, and extends as far N. as Iceland. It requires deep water of over 200 fathoms. It is also worked during the winter over the Dogger Bank and Cromer Knoll. Boulter ('spiller' in Devonshire and Cornwall) is the term usually applied to the long line used off the S. coast of England, which is not so long as the North Sea type, and is worked from smaller open boats.

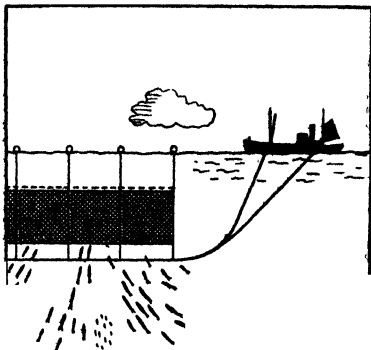
Fishing by line has sev. advantages over the use of nets. The fish secured by a line are less bruised and injured, and thus preserve their freshness better. Also, long lines can be shot over rough rocky ground and in mid-water, where trawling, etc., is impossible. Many species of fish may be secured by either method, but some, such as congers, seem to be only caught by lines, and others, such as soles, only by nets.

Fishing by nets is of many different varieties. Of these the most important is trawling, by which most of the fish for the Brit. market is secured. Trawling is an industry which has been altogether developed during the last century. First used in the SW. of England, it was introduced at Ramsgate in 1815, Harwich in 1828, Hull in 1844, and Grimsby in 1858. Steam trawlers made their appearance in 1879, and have largely increased in number, being faster and more seaworthy, and having a much larger fishing capacity than the sailing vessels. The modern steam trawlers are about 180 ft long. The North Sea, off the E. coast of England, is a trawling ground, and large numbers of boats are based on Hull, Grimsby, Yarmouth, Lowestoft, and Ramsgate. But the most profitable trawling grounds are those in the N., such as round Iceland, Bear Is., Greenland, and in the White Sea. The SW. coast trawlers work independently from Brixham and Plymouth, and fish near those ports in winter and S. of Wolf Rock, or off the N. coast of Cornwall, in summer. Some trawling is done by steam tugs from Falmouth and Cardiff. Another trawling ground lies off the NW. coast of England, and is worked by boats from Tenby, Whitehaven, Fleetwood, Blackpool,

Southport, and Liverpool. The Scottish trawlers are almost all steamboats, and work outside the Firth of Forth, off the coast of Aberdeenshire, and in the Moray Firth, the vessels coming from Granton, Leith, and Aberdeen. A large fleet of Irish trawlers, with Dublin as their H.Q., fishes between the Irish coast and the Isle of Man. Trawls are of 2 kinds, the beam and the otter, the latter being the newer and better. The beam trawl is a large conical bag-shaped net, with a wide mouth kept open by a beam of wood, which has iron runners at its ends. The lower edge of the net is weighted, and the whole apparatus is dragged by the boat over the sea bottom, thus enclosing the low-swimming fishes in a kind of bag formed by the hind end of the net. The net is often 80 ft long and the beam measures from 18 to 50 ft. The net is kept extended by a stout foot-rope, and a ground rope stirs up the fishes. The net is brought on board by means of a warp of strong steel wire attached to the bridle-ropes, and the haul is emptied at the cod end, i.e. that farthest from the beam. In the case of the otter trawl, the single heavy beam is replaced by 2 boards which automatically come apart when the trawl is let down and come together when it is hauled in, thus rendering the latter operation much easier. The boards are often weighted with iron plates, and only 1 edge rests on the ground, while a direct pull on the trawl is obtained by the use of from 6 to 12 ft of chain between them and the bridle. A simpler form of the otter trawl is used by lt. and Sp. fishermen. The labour involved in trawling is very considerable, since the hauling of a heavy trawl on board takes at least an hr, and the expense caused by damage done to the nets by obstacles on the sea-floor is often heavy. Almost every kind of fish is caught in greater or smaller numbers by the trawl, though ground-feeding species predominate. Flat fish always form a large proportion of the haul, which includes sole, plaice, ray, conger, red mullet, dory, mackerel, bass, turbot, brill, halibut, cod, haddock, hake, gurnard, and ling (q.v.).

The drift-net forms one of the most scientific methods of fishing, depending as it does on knowledge of the habits of certain kinds of fish and observation of their whereabouts at certain times. The net is set up in the water, being kept in a vertical position by weighting the lower end and buoying the upper with cork, wood, or glass floats, and is allowed to drift with the tide or current in such a way that it is at right angles to the direction which is being taken by a school or shoal of fish. The fish are caught by the gills, which become entangled in the netting. The nets, which are long and straight, may be used at the surface, as is most commonly the case, or at different depths, by means of weights and buoys. Fishing by drift-net is carried on off Cornwall for pilchard, with nets 40 fathoms by 4, having 40 meshes to the yd; for mackerel, with nets 20 fathoms by 16, with 28

meshes to the yd; and for herrings, with nets 40 fathoms by 4½, with 36 meshes to the yd; off the E. coast and the Scottish shores for herring, with nets 30 fathoms by 9; and at the E. end of the Channel for mackerel. Ground fish, such as cod and turbot, are also caught by sunk drift-nets. The fishing is carried on in Cornwall from about 5 in the afternoon till 8 or 9 in the evening, this being the time when shoals of pilchard and such fish spread out, all the fish heading away from the land. Each boat shoots a fleet of nets, numbering from 16 to 20 for pilchard and herring,



DRIFT-NET

Herring, mackerel, and fish that swim nearer the surface are caught by drifters which drag a series of nets between them. The net is kept close to the surface by floats; the fish are caught by their gills.

and 80 for mackerel, to windward of itself, and boat and net drift together, the former being kept head to wind by a small mizzen sail. A large number of boats can fish on the same ground, drifting parallel, without the nets becoming entangled. When the nets are hauled in, the fish are torn from the meshes and thrown on deck. Trawling and drift-net fishing have been seriously hampered on some parts of the Brit. coast, notably the coast of Devon and Cornwall, by sunken wreckage, resulting from the submarine destruction of shipping during the First World War. Great damage is suffered by the nets, which are frequently torn by projections and wrecks which have spoilt some of the best trawling beds on the S. coast.

Another method of fishing with nets is by the use of seines or scans. These are long nets, weighted below and buoyed above, which are dragged around a shoal, the fish being then brought in them either to the shore or the boat. In its simplest form seining is carried on from shore. One end of the net is fixed on the beach, the rest of the net is taken on board a boat and dropped over the stern as the boat makes a semi-circle. When the

vessel again reaches shore the net is brought in by means of the 2 ends being drawn together either by man-, horse-, or steam-power. A level bottom is necessary for this operation, which is largely performed on sand-banks, in riv. estuaries, as in the sand-eel fishery at Teignmouth. A more complicated type of seining is that carried on at St Ives for pilchards during the late summer and autumn. This involves the use of a seine-boat, 32 ft long, and manned by 6 rowers, and 2 men to work the net, 2 boats with the stop net, and a 4th boat, known as the lurker, from which directions are issued. The seine measures 160 fathoms by 6 or 8 ft, and the stop-net is 70 or 80 fathoms long. The pilchard fishery is protected by very stringent regulations, and has some interesting customs in connection with it, such as the employment of huers, who signal the approach of shoals from look-out stations. A variation of the seine is the purse-seine, used in deep water for mackerel, which has a rope run through the bottom, so that it can be drawn up into a large bag, which encloses the fish. Purse-seines are 900 to 1500 ft long, and 160 to 180 ft deep, and are set by large rowing boats accompanying the seine-boat.

The trammel is an ingenious arrangement consisting of 3 walls of netting, set alongside each other, of which the middle one has a much smaller mesh and is set much more loosely and slackly than the 2 outer ones. The nets are set up and down the tide, and a fish, striking through the large mesh of one of the outer nets into the small-meshed centre one, carries this with it through the large mesh of the 3rd net, and is thus imprisoned in a bag of the small meshed and slack middle net. A trammel is usually 40 to 50 fathoms long and 1 to 1½ fathoms deep, with the 2 outer nets of a 12-in. mesh, and the inner one of a 2½-in. mesh. Red mullet, bass, and lobsters are largely caught by this means, particularly off the Cornish coast.

There are numerous minor varieties of nets. The fyke net is a long cylindrical bag kept open by hoops, which terminates in a pocket entered by a funnel-shaped opening, through which the fish will not return. Long straight nets, termed leaders, extend from the mouth to direct the fish towards it. The fyke net is set in fairly deep water, at the bottom. The pound net has a long straight leader, running out from shore to a bag-like net from which the fish cannot escape. Fish swimming along the shore come against the leader, and in attempting to swim round it, follow it down to the enclosure at the end. Pound nets are set in rather shallow water and are supported by stakes. Another type is the Lancs stake net, a long straight net 900 ft long and 3 ft wide, which is stretched across the tide on stakes. The fish, mostly plaice, are entangled in its meshes, and taken out when the tide goes down. Plaice are also caught in the hedge-baulk, which is a net set between long wicker walls. The stow, or bag net, is used in the Thames estuary,

the Solent, the Lynn estuary, Boston Deep, and the Firth of Forth. It is a kind of moored beam-trawl, being a large funnel-shaped bag 60 yds long, and having an opening 20 to 30 ft square. The fishing is from an anchored boat, and the flowing or ebbing tide carries the fish into the mouth, which is kept open by wooden spars. Sprats, herrings, and other small fish are caught in this way. The ground or set net works on the same principles as the drift net, but is anchored upright on the sea bottom. Herring, cod, turbot, and skate are captured by this means. Oysters are caught by a dredge resembling a beam-trawl, with the netting made of iron rings and the beam of iron also.

Traps are only used for crabs and lobsters. In the most common pattern a framework of wicker or wood is covered with netting. A bait is placed inside, and the opening is so arranged as to prevent the escape of the crab, etc., when once inside.

In recent years experiments have been carried out with a ring-net, in conjunction with an echo-sounder. Originally an aid to navigation, the echo-sounder sends sound impulses from the ship to the ocean-bed. The time taken for the echo to return to the ship is measured, and the depth of water or configuration of the ocean-bed can be recorded as a picture. It was observed that the instrument would record any comparatively solid body between the bottom and the surface, such as a dense grouping of fish. Having located the shoal the boat steams in a circle, paying out the ring-net as it goes. The haul is brought aboard after the fish have been completely ringed. The element of uncertainty which always exists in fishing is thereby likely to be dispelled, as the fisherman will cast his nets where the fish are virtually seen. Another recent contribution of science to fishing has been in the field of stimulating plant growth in the beds of sea lochs in Scotland by means of putting phosphate in the water. Experiment has shown that the quantity of fish inhabiting the waters has increased and thereby the catches.

Regulation of Fisheries.—The control of the F. of Great Britain was, from 1889 to 1903, vested in the F. dept of the Board of Trade. In 1903 these functions were transferred to the Board of Agriculture and Fisheries, now the Ministry of Agriculture, Fisheries, and Food. There is a separate Fishery Board for Scotland, which was instituted in 1882. It may be of interest briefly to consider the hist. of the administration of Brit. sea-F. The first effort to obtain definite and authoritative information on the state of sea-F. was made by the royal commission of 1860, which consisted of Mr John Caird, Prof. Huxley, and Mr G. Shaw-Lefevre. This reported in 1866 that the sources of supply gave reason for no uneasiness, and that fishing by all means should be allowed unrestricted freedom. The recommendations of the committee were included in the Sea Fisheries Act of 1868. Another royal commission in 1878 made

an inquiry into the effect of the use of beam-trawls and ground seines upon fish spawn and fry. A royal commission in 1883 for inquiry into the damage done to line and net fishing by the use of the trawl resulted in the estab. of fishery statistics (1885-7). The foundation in 1884 of the Marine Biological Association of the U.K., which receives a gov. grant, has done much to assist the scientific study of marine biology. When the International Council for the Exploration of the Sea was formed in 1902 the Marine Biological Association undertook the Eng. part of the investigations. But at the time of the First World War the gov. took over much of the F. research, which is carried on at a special laboratory at Lowestoft. The Sea Fisheries Regulation Acts of 1888-94 provided for the estab. of local committees with powers for the regulation of coast F. In 1899 the control of Irish F. was vested in the Dept of Agriculture and Technical Instruction for Ireland. Some valuable recommendations were made in 1902 by the committee on ichthyological research, appointed by the Board of Trade, and further suggestions were made by a departmental treasury committee in 1907, all urging the continuation and extension of scientific research on subjects connected with the F. The regulation of gov. aid to such investigations is now in the hands of the development commission, which was appointed under the Development and Road Improvement Funds Acts of 1909 and 1910, and makes advances for the development of F. as well as agriculture, etc.

The right of fishing in Brit. territorial waters belongs solely to Brit. subjects, and can be claimed by foreigners only by convention. This right strictly belongs to the Crown, but the royal right is only claimed in certain cases; e.g. whales, sturgeons, porpoises, and grampuses are royal fish and Crown property, by whomsoever they are caught, and salmon, oyster, and mussel F. are still held by the Crown. On the high seas, outside territorial waters, the right of fishing is open to all, but may be regulated by custom or convention. Such conventions were made between Great Britain and the U.S.A. in 1818, 1872, and, as a result of the Bering Sea arbitration, in 1892; between Great Britain and France in 1839 and 1867; and between the countries having a North Sea seaboard in 1882.

Summarised statistics of British Fisheries.—The catches of the more important food fishes in 1938 and 1953 are given below:

	Catch in tons	
	1938	1953
Cod and allies	735,300	708,800
Herring and allies	284,400	246,600
Flatfish	64,700	66,200
Skates, rays, dogfish	33,500	31,600
Mackerel	10,200	4,500
Shellfish	30,000	26,100
All species	1,197,800	1,121,600

For England and Wales the value of fish (excluding shellfish) on landing in 1953

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was £30,322,350. The shellfish were valued at £931,350. The corresponding figures for Scotland were £10,678,100 and £297,700.

Foreign vessels also land some white fish direct from the fishing grounds. In the year ending on 31 Mar. 1953, 42,500 tons were landed. The U.K. exports less fish than it did before the Second World War, this being due to competition from such countries as Norway and Denmark and to the good prices obtainable at home. In 1938 fish exports were approximately 239,000 tons while post-war the yearly figure has never exceeded 100,000 tons. Imports have remained more or less at the pre-war level.

However, the 30,000 or so fishermen of Britain catch an average of 35 tons per head, a figure exceeding that for Norwegian or U.S. fishermen. In 1951 the Brit. fishing fleet consisted of 9473 vessels (steam trawlers, other steam vessels, such as drifters, motor vessels, small motor-boats, and sailing boats). More detailed statistics on fish, fishermen, and fishing vessels can be obtained from the Sea Fisheries Statistical Tables and the Report on the Fisheries of Scotland, which are pub. each year by H.M. Stationery Office.

World Fisheries.—Asia, with an output of some 13 million tons of fish per year (in 1952) has the highest catch of any continent. The yearly totals for Europe and North America are 8,250,000 and 3,400,000 tons respectively. Of the Asian countries, Japan catches over 4½ million tons per year and China over 3 million, while India takes about 1 million tons. The particularly valuable fishes for Japan are tunny and allies, sardines and allies, and cod and allies. Molluscs are also a very important item, and so are salmon.

Norway, with a yearly catch of over 1½ million tons of fish easily leads any of the other European countries (if European Russia is taken as a unit). Much of the recent increase in Norway's output is due to improved methods of catching herring, due to skilful employment of echo-sounding to locate the shoals. European Russian production is now estimated at some 1½ million tons per annum, but including the Asian part of the U.S.S.R. the total catch is over 2½ million tons. The U.K. figures for 1953 were 1,121,600 metric tons. W. Germany caught 730,400 tons in 1953, while Spain and France caught 625,000 and 490,000 tons respectively. Taking the European region as a whole, the important food fishes are the herring and allied species, cod and allies, flatfishes, salmon and allies, sharks and rays, tunny and mackerel and shellfish.

In North America, the U.S.A. and Alaska, with a yearly output of 2,385,200 tons in 1953, is by far the leading fishing country. Canada and Newfoundland together account for nearly 1 million tons. The important fishes for the U.S.A. are pilchard, menhaden, herring, various molluscs, various kinds of sea perches, cod and allies, salmon, tuna and mackerel,

and various crustaceans. Both Canada and the U.S.A. take considerable quantities of fish from the Great Lakes. Salmon is the most valuable fish for Canada.

African F. yielded some 1½ million tons in 1953. The Union of South Africa has 2 particularly important food fishes in the Cape, hake and the sardine (*Sardinops sagax*), while sardines are also of importance in the Moroccan area and in parts of the Mediterranean.

The South Amer. catch is estimated at 600,000 tons per year, the output being mainly shared by Brazil, Chile, Peru, Argentina, and Venezuela. Various kinds of sea perches, herring and allies, tunny and mackerel, hake and grey mullet bulk large in the catches.

Finally, Australasia and the Pacific Is. had an estimated catch of about 150,000 tons in 1951, which is less than 1 per cent of the world total.

Flaher's Hill, precipitous bluff in the Shenandoah valley, Frederick co., Virginia, 30 m. SW. of Winchester. It is noted for a battle fought there in 1864, when the Federal troops under Sheridan gained a victory over the Confederates under Gen. Early. The Confederates lost about 1400 men, while the Union lost 509.

Fishery Board for Scotland was instituted in 1882 to take the place of the Board of Brit. White Herrings, which was simultaneously dissolved. Investigations had been made and plans had been brought forward to prevent the destruction of the spawn of sea fish, and the F. B. for S. was entrusted with the task of improvement. A comprehensive programme of investigations has since been carried on successfully with international co-operation. The fisheries laboratory of the Scottish Home Dept is at Aberdeen and there is a freshwater laboratory at



British Railways

FISHGUARD HARBOUR

Whaling.—The fishery for whales (q.v.) is now largely carried out in the Southern Ocean. The output of whale oil from whales caught S. of lat. 50° S. is now about ½ of the world total. The main countries using this region and their total yearly produce of whale oil for 1951 in tons is as

Norway . . .	195,600 tons
U.K.	83,300 tons
South Africa . . .	42,700 tons
Japan	34,600 tons
U.S.S.R.	31,000 tons

See also the articles on individual fishes.

See W. Brabazon, *Deep Sea and Coast Fishing of Ireland*, 1848; J. B. Karr, *La Pêche*, 1878; N. Wood, *North Sea Fishers*, 1911; P. F. Anson, *Fishing Boats and Fisher Folk of the East Coast of Scotland*, 1930, and *Mariners of Brittany*, 1931; G. L. Alward, *Sea Fisheries of Great Britain*, 1932; A. Stanford, *North Atlantic Fishermen*, 1939; F. Fraser Darling, *The Seasons and the Fisherman*, 1941; A. Hamilton Jenkin, *Cornwall and its People*, 1945; J. W. Kempster, *Our Rivers*, 1948; M. Graham, *The Fish Gate* (revised ed.), 1949; R. Morgan, *World Sea Fisheries*, 1956; The Buckland Lectures series.

Fisheries, Ministry of Agriculture and, see FISHERIES and AGRICULTURE, FISH-, AND FOOD, MINISTRY OF.

Pitlochry engaged on brown trout research. The important regulations of the Salmon and Fresh Waters Fisheries Act of 1923 do not apply to Scotland.

Fishguard, seaport tn of Pembrokeshire, Wales, situated at the mouth of the R. Gwaen in F. Bay, 18 m. SW. of Cardigan, and 248 m. from London. It gives its name to an urb. dist. which comprises the original fishing vil. of Lower F., modern F. on the cliff above, Goodwick, and the Harbour Vil. On the cliff top the tn centres round the market-place; below, the old fishing vil. retains its quay and pier as reminders of its former industry. F. Bay provides good shelter and anchorage; there is sufficient depth of water to take the largest ocean liners. Passengers mail, and freight are carried between F. Harbour and Ireland; this is the shortest sea crossing to Ireland, F. being 54 m. from Rosslare. Boats also go to Cork and Waterford. Pop. of urb. dist. 4900 (1953).

Fishing-eagle, see OSPREY.

Fishmongers' Company, one of the 12 greater livery companies of the city of London, whose first charter was granted by Edward I in 1272. Under charters the company's officials examine all fish coming into London, and condemn that which is bad. In addition to its charter powers, the company has statutory powers in connection with salmon and

fresh-water fisheries, and under other acts relating to fisheries. F. Hall has been on its present site since the 15th cent.; the existing building dates from 1834 and was extensively damaged by enemy air raids in 1940. The restoration was completed in 1951. The company administers the foundation of Gresham School, Holt, Norfolk, and maintains 2 almshouses.

Fiske, John (1842-1901), Amer. writer and philosopher. In 1869 he was appointed lecturer on philosophy at Harvard, and in 1881 at St Louis Univ. His first philosophical work in literature was *Outlines of Cosmic Philosophy*, 1874. Other works include: *The Unseen World*, 1876, *The Origin of Evil*, 1899, and historical works such as *The Discovery of America*, 1892, *Old Virginia and her Neighbours*, 1897, and *New France and New England*, 1902. His collected writings were pub. in 24 vols., 1902. See T. S. Perry, *John Fiske*, 1906.

Fission, in atomic science, the splitting of the nucleus of an atom by bombardment with neutrons or other atomic particles. Thus the nuclei of plutonium, uranium, and other elements undergo F. with the release of vast quantities of energy. The nuclei of heavy elements are more susceptible to F. than those of light elements. The products of F. are usually radioactive. See ATOM and ATOMIC THEORY; NUCLEAR POWER; ATOMIC BOMB.

Fistularia (Lat. *fistula*, a pipe), generic name of a fish belonging to the family of *Fistulariidae*, or flute-mouths. It is characterised by a long tubular muzzle, terminating in a small mouth, and by the pelvic fins consisting of 6 soft rays. The body is naked and the forked caudal fin has one or two of its middle rays produced into a long whip-like filament. This genus inhabits the tropical Atlantic, Pacific, and Indian Oceans, and the family is allied to the pipe-fishes and sea-horses.

Fistulina, genus of hymenomycetous fungi, of which one species, *F. hepatica*, is common to Britain. It grows principally on old oak-trees, and is the edible 'beefsteak' fungus, so called because it resembles the meat. It is also the cause of 'Brown Oak' timber used in furniture making.

Fitch, John, see SHIPS AND SHIP-BUILDING.

Fitch, Ralph (fl. 1583-1606), traveller, who is remembered as the pioneer Englishman to take the overland route to India. He set out in 1583 and returned in 1591. The account of this journey was pub. by Hakluyt in 1599. See J. H. Ryley, *Ralph Fitch, England's Pioneer to India and Burma*, 1899.

Fitch, William Clyde (1865-1909), Amer. playwright, b. Elmira, New York state. A very versatile writer, he wrote more than 30 popular plays, including melodramas, farces, social comedies, and historical plays. *Beau Brummell*, his first, was produced in 1890; others are *Nathan Hale*, 1899, *Barbara Frietchie*, 1900, *The Climbers*, 1901, and *The City*, 1909. *The Girl with the Green Eyes*, 1902, a psychological study, is commonly reckoned his

most important work. See M. J. Moses and V. Gerson, *Clyde Fitch and his Letters*, 1924.

Fitch, see FUR.

Fitchburg, city of Massachusetts, U.S.A., in Worcester co. It is situated 50 m. N.W. of Boston on a branch of the Nashua R. The prin. manufs. are pulp, cotton, and woollen goods, also foundry, machine-shop, and electrical products, shoes, tools, and handbags. There are granite quarries. Pop. 42,700.

Fittig, Rudolf (1835-1910), Ger. chemist, b. Hamburg. Studied chem. at Göttingen. He assisted Wöhler, the organic chemist, in 1858, and taught in Göttingen, 1860-70. Prof. of chem. at Tübingen, 1870-6; thenceforward prof. at Strassburg. He discovered the lactones, or anhydrides of oxyacids, and synthesised sev. hydrocarbons. He was the discoverer of phenanthrene. F. re-ed. Wöhler's works, and wrote *Über Aceton*, 1858, *Das Wesen und die Ziele der chemischen Forschung und des chemischen Studiums*, 1870, and *Grundriss der anorganischen Chemie*, 1872.

Fittou, Mary (fl. 1600), maid of honour to Queen Elizabeth I, and one of the performers in the masque at the wedding of Lord Herbert in 1600, shortly afterwards becoming his mistress. Attempts have been made to identify her with the 'dark lady' of Shakespeare's sonnets.

Fitz, from the Norman-Fr. word *fit* (Lat. *fluit*), meaning son. It was and is used as a prefix to a surname to show descent—as the Scottish prefix *Mac* and the Irish *O'*—appearing in such words as Fitzwilliam and Fitzhamilton. It was also used as the surname of illegitimate children of kings or princes, as in Fitzjames and Fitzclarence.

Fitzalan, Edmund, Henry, and Richard, see ARUNDEL, EARLS OF.

Fitzgerald, Lord Edward (1763-98), Irish rebel and patriot, son of the 1st duke of Leinster. He served in the Brit. Army until 1792, when he was cashiered for being present at a revolutionary meeting at Paris. He was described by Cobbett, who served under him in the 54th Regiment, as the only really honest officer he had ever known. He now threw in his lot with the United Irishmen, and began to prepare schemes for an Irish rising. He was taken prisoner, and a wound that he had received in the struggle mortified; he d. in Newgate on 4 June.

FitzGerald, Edward (1809-83), poet, b. Bradfield House, Suffolk. He went to Trinity College, Cambridge, in 1826, and there made lifelong friendships with the Tennysons, Thackeray, Spedding, W. H. Thompson, and the rest of the coterie. When he came down from the univ. he settled at Woodbridge. He found pleasure in letter-writing and in yachting, but his prin. interest was in books. In 1851 he pub. anonymously *Euphranon, a Dialogue on Youth*, and in the following year *Polonius, a Collection of Wise Sayings and Modern Instances*. He issued in 1853 a free trans. of *Six Dramas of Calderon*, and 6 years later gave to the world his rendering of the *Rubidit* of Omar

Khayyám, which has made him famous in all the Eng.-speaking countries and has passed through innumerable eds. But Quaritch, who first pub. 250 copies in 1859, met no success with it, and it was only after Rossetti found a copy in the 'fourpenny box' outside Quaritch's shop that the work began its road to fame. Other and more faithful trans. have been produced, but none approaching that of F. for glow and atmosphere. His complete works and correspondence were ed. in 1902 by Aldis Wright, and there are biographies by Groome, 1895, Thomas Wright, 1904, A. C. Benson, 1905, and A. M. Terhune, 1947. See also essay by L. Housman and biography by G. F. Maine in Collins's ed. of *The Rubáiyat*, 1947.

Fitzgerald, Francis Scott Key (1896-1940), Amer. novelist. b. St Paul, Minnesota. Educ. at Newman School in New Jersey, and Princeton, he pub. his first book, *This Side of Paradise*, in 1920. *The Beautiful and Damned*, 1922, was a perfect expression of the prevalent post-war cynicism, while his finest novel, *The Great Gatsby*, 1925, shows up the false values of his generation, and *Tender is the Night*, 1934, he called his 'novel of deterioration.' An unfinished novel, *The Last Tycoon*, was pub. posthumously. His notebooks and letters were pub. in 1945 with the title *The Crack-up*. See A. Mizener, *The Far Side of Paradise*, 1951.

Fitzgerald, Robert, see AUSTRALIAN LITERATURE.

Fitzgibbon, John, see CLARK, EARL OF. **Fitzherbert, Maria Anne** (née Smythe) (1756-1837), wife of George IV, though not acknowledged as such. She was b. in Hants, and had been twice married before meeting George—then prince of Wales—to whom she was married in 1785—the marriage not being valid according to the Royal Marriages Act of 1772 as it had taken place without the king's consent. On marrying Princess Caroline he, for a time, broke off relations with Mrs F., but the liaison was soon resumed, and not finally ended until 1803. See S. Leslie, *Mrs. Fitzherbert*, 1939.

Fitzjames, see BERWICK, DUKE OF.

Fitzmaurice, Edmond George Petty-Fitzmaurice, 1st Baron (1846-1935), politician and biographer. b. London, son of the 4th marquis of Lansdowne. Educ. at Eton and Trinity College, Cambridge, he became an M.P. in 1869. He was under-secretary for foreign affairs in 1882 and again in 1906, when he was raised to the peerage. His works include *The Life of William, Earl of Shelburne*, 1875-7, *Sir William Petty, the Political Economist*, 1895, *Charles William Ferdinand, Duke of Brunswick*, 1901, and *The Life of George Leveson-Gower, second Earl Granville*, 1905. He was made a fellow of the Brit. Academy in 1914.

Fitzmaurice, Sir Maurice (1861-1924), chief engineer of London Co. Council (1901-12), graduated as M.A. and M.E. from Trinity College, Dublin. Among his engineering works were the Rotherhithe tunnel, the subway for electric trams

below Kingsway, and the electric tramways, and the duplication of the main drainage system of London.

Fitzmaurice-Kelly, James (1857-1923), scholar. b. Glasgow, son of Col. T. Kelly. A Rom. Catholic, he made a special study of Spain, and in 1892 pub. a life of Cervantes. His *History of Spanish Literature*, 1898, caused him to be recognised as an authority on the subject. In 1909 he became prof. of Spanish at Liverpool, and in 1916 at King's College, London. Among his other works are *Lope de Vega and the Spanish Drama*, 1902, *Chapters on Spanish Literature*, 1908, and *Cervantes and Shakespeare*, 1916. He also ed. Cervantes's complete works, 1901, and the *Oxford Book of Spanish Verse*, 1913. He was made a Fellow of the Brit. Academy in 1906 and held many other distinctions.

Fitzroy, Augustus, see GRAFTON, DUKE OF.

FitzRoy, Robert (1805-65), adm., hydrographer, and meteorologist. From 1828 to 1830 he captained the *Beagle*, then employed in a survey of the coast of Patagonia, Tierra del Fuego, Chile, and Peru. It was during this voyage that he discovered the inland sea called Otway Water, and its connection with the salt Skyring Water by means of what came to be known as F. Channel. During a circumnavigating voyage in the *Beagle* in 1831-6, when Charles Darwin accompanied him, F. not only ran a chronometric line round the world, but recorded a number of invaluable meteorological observations, the most famous of which are his storm warnings. These were all gathered together in his *Weather Book* of 1863. He was the first director of the Meteorological Office (q.v.); and governor of New Zealand from 1843 to 1845.

Fitzroy: 1. City of Victoria, Australia, in Bourke co. It is 2 m. N.E. of Melbourne, and it forms a suburb of that place. Pop. 35,000.

2. Riv. of Queensland, Australia, formed by the junction of the Dawson and Mackenzie rivs. It flows E. into the Pacific, near the tropic of Capricorn, at Keppel Bay, and is navigable from its mouth for 35 m. to Rockhampton.

3. Largest riv. of W. Australia, whose source is in King Leopold Mts. It has a westerly course, flowing through beautiful well-watered plains, and finally enters King Sound. The source of the F. was discovered in 1842 by Stokes, although the riv. itself was not explored until 1897.

Fitzsimmons, Robert (1862-1917), prize-fighter. b. Helston, Cornwall; taken to New Zealand, 1871; became amateur boxing champion there. In 1890 he went to the U.S.A.; won middleweight championship in New Orleans, 1891; won heavyweight world championship from Corbett (q.v.) at Carson City, 1897. Beaten in Coney Is., 1899, by Jeffries. Beaten by Jack Johnson in 1907.

Fitzstephen, William (d. c. 1191), biographer of Thomas Becket, wrote in 1174 his valuable if biased *Life and Passion of Archbishop Becket* (first printed 1723). F. was present at Becket's death.

Fitzurse, Reginald (fl. 1170), Anglo-Norman knight, one of Becket's murderers. He is said to have *d.* in Palestine while doing penance for the murder. *See* BECKET, THOMAS.

Fitzwilliam, William Wentworth, 2nd Earl Fitzwilliam (1748-1833), statesman, succeeded the 1st earl in 1756. He succeeded in 1782 to the estates of his uncle, Lord Rockingham, and was one of the richest peers of his day. An enthusiastic Whig, he was one of the duke of Portland's party who joined Pitt in 1794, and was later in the year appointed lord lieutenant of Ireland. He held this office only for a

them a Titian, a Veronese, and a Rembrandt, an important series of Rembrandt's etchings, and numerous prints by other engravers, 130 medieval MSS., and a remarkable collection of MS. and printed music. The collections have been greatly enlarged by subsequent benefactions which have been continuous since the foundation of the museum. It now ranks with the finest in the world and houses excellent and representative collections of paintings of most schools, outstanding collections of medieval MSS., music, prints, coins, and ceramics (European and Oriental), besides Egyptian and



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FITZWILLIAM MUSEUM

few months, being recalled for supporting the Rom. Catholics' claims in defiance of his instructions. He was president of the Council in 1806 under Grenville, but after this did not again take office. He was a friend of Charles James Fox (q.v.).

Fitzwilliam Museum, Cambridge, founded in 1816 by Richard, 7th Viscount F. (M.A., 1764), who bequeathed to the univ. his fine art collections, his library, and the sum of £100,000 to provide and endow a museum. The building, a handsome example of 19th-cent. classical architecture, stands in Trumpington Street to the S. of Peterhouse. The Marlay Galleries and McClean Coin Room were added in 1934, the McClean MSS. Room in 1925, the Courtauld Galleries in 1931, the Henderson Galleries and Charrington Print Room in 1936, and the Graham Robertson Room, for drawings and water-colours, in 1955.

The collections bequeathed by the founder included 144 pictures, among

classical antiquities, armour, textiles, medieval and Renaissance works of art, and a library. The 3 most recent directors have been Sir Sydney Cockrell (q.v.), 1908-37; Mr Louis C. G. Clarke, 1937-46; and Mr C. Winter, since 1946.

Fiume, *see* RIJEKA.

Five Members, The, of parliament, were John Pym, Denzil Holles, Sir Arthur Haselrig, Wm Strode, and John Hampden. Charles I's attempt to arrest them on 4 Jan. 1642 was one of the incidents which helped to touch off the Civil war.

Five Mile Act, passed in 1593, penalised Rom. Catholics who had been convicted of recusancy for going a greater distance than 5 m. from their homes. It was repealed in 1844, but had become inoperative long before. A more famous act of the same name was passed in 1665, as part of the Clarendon Code, whereby no Nonconformist minister could come within 5 m. of any tn or bor. corporate or any place whatever where he had preached or

taught since the Act of Oblivion (1660) unless he first took the oath of non-resistance and subscribed to the Act of Uniformity. This law remained in force till 1689.

Five Towns, the phrase coined by Arnold Bennett, the novelist, to denote the dist. of Stoke-on-Trent (q.v.).

Five Year Plans, P. in Soviet Russia for the development of the country's economy. The 1st F. Y. P. covered the years 1928-32, the 2nd 1933-7, the 3rd 1938-42 (implementation interrupted by the war), the 4th 1946-50, the 5th 1951-5, and the 6th F. Y. P. was to extend over 1956-60. The P. are drawn up on the basis of directions from the highest Communist party authorities by the State Planning Committee (*Gosplan*) in conjunction with the ministries concerned, and their outlines are usually approved at a party congress. On the basis of the F. Y. P. yearly economic P. are drawn up for the country as a whole, for each branch of the economy, each territorial div., and each individual enterprise. All these P. ostensibly have the force of law. In fact they are practically never carried out as such, some targets being surpassed, others not reached. Considerable changes in the P. by the authorities during the plan period are also frequent. The P. do not eliminate disproportions and waste (sometimes they actually cause them), but they are useful in providing landmarks by which managements and the public at large orientate themselves. The 6th F. Y. P. was scrapped in 1957 and the *Gosplan* was charged with the task of working out a 'long-term plan' extending over 1959-65. The practice of F. Y. P. or similar P. has been introduced in all countries where Communist regimes were estab. after 1945, as well as (in modified forms) in some underdeveloped non-Communist countries. See H. Schwartz, *Russia's Soviet Economy*, 1951; M. Dobb, *Soviet Economic Development since 1917*, 1948.

Fives, game of handball, 2 or 4 players hitting a ball against a wall or walls to force an opponent into error. It probably derives, like racquets, from the Fr. *jeu de paume*, or hand tennis. Various explanations of the name have been offered, the most common being that it refers to the 5 fingers of 1 hand; in parts of Scotland a fist is still called a 'bunch of fives.' In England there are 3 forms of the game, distinguished from one another by the names of the schools in which they grew up—Eton, Rugby, and Winchester F. Under the name of handball a similar game is played in Ireland and the U.S.A. There is no need for any of the expensive and stylised courts described below—a smooth wall, a floor with marked lines, a golf ball, and gloves are enough to make an arduous and attractive game.

Eton F. is essentially a doubles game, though a singles game can be played. The court is enclosed on 3 sides and divided by a shallow step into 'upper' and 'lower' courts, the upper court being 10 ft by 14 ft. The 'pepper box' is a

buttress projecting from the left-hand wall, its larger part in the lower court. The server stands in the upper court, his partner and the 2 opponents in the lower court; he throws the ball against the front wall above 'the line' (a horizontal ledge running across at a height of 4 ft 6 in.) so that it bounces on to the right-hand wall near the top and falls into the lower court. The receiver has 'first cut,' taking the ball on its first bounce; he need not accept the serve until he gets one that he likes. After the 'first cut' each pair strikes alternately on the volley or first bounce until one side fails to return the ball above the line. Either the serving side scores a point or the first server gives place to his partner, then their opponents take service. Only the servers score. The game is played 15 up.

The Rugby F. court lacks the hazards of the Eton one, but the existence of a 4th wall gives the game its own character and peculiar difficulty. The court is 28 ft by 18 ft, the front wall is 15 ft high, the back wall 6 ft high, and the side walls slope between them. The ball has to strike above a board running across the front wall at a height of 2½ ft. During a rally a player may hit the ball directly on to the front wall, or against any other wall of the court instead, but before touching the ground it *must* strike the front wall above the board.

Winchester courts are about 28 ft by 18 ft at the front wall, and 9½ in. narrower at the back wall. The court narrows sharply on the left side to form a semi-buttress. In singles the buttress must not be struck full pitch with the first cut. In Rugby doubles only the server may take the striker's return of service, in Winchester P. either partner may do so.

In Irish handball, the 'alley' or court is about 60 ft by 28 ft, the front wall, 30 ft high, and the back wall, 9 ft high, being connected by sloping side-walls. The game (singles and doubles) consists of 21 points and the server alone can score, service passing to his opponent when he is forced into error. In the 1st innings of a doubles game a pair has only 1 serving 'hand,' otherwise partners serve alternately. The server, standing between two lines marked on the court, bounces the ball and hits it against the front wall from the first bounce. All-Ireland (hard ball and soft ball) Championships are held annually and there are occasional international matches with U.S.A.

Fivestones, traditional game played with pebbles, now surviving on the school playground. Each player goes through an elaborate marathon of manipulations with his 5 stones until he fails, when the next player tries. When the others have failed the first starts where he left off last time. Here are a few samples of the operations involved. Throw up 5 pebbles and catch them first on the back, then in the palm, of the hand. If one is caught, play continues. Stones on the ground are picked up in this way: lay down all caught stones but one, and throw this up; while it is in the air lift one of the dropped

stones, catch the falling one and carry on throwing and lifting until all the laid stones are gathered. Other later moves include making an eye with thumb and forefinger, placing the side of the hand farthest from the eye on the ground, throwing a stone, lifting another and dropping it through the eye before catching the one in the air, and so on until all the stones are dropped through the eye.

Fixed Stars, see STARS.

Fixed Trusts, see UNIT TRUSTS.

Fixtures. Generally speaking, the term *F.* denotes anything in the nature of personal property that has become annexed to the freehold so as to become part and parcel of it. More popularly, *F.* may be defined as things of an accessory nature annexed to houses or lands. The justification for the old common law doctrine of the irremovability of *F.* was that if any limited owner, e.g. a tenant for life or for years, removed the *F.*, he necessarily committed waste, i.e. an act of destruction which injured or diminished the value of the inheritance; and, further, that the mere fact of annexation indicated an intention to abandon his ownership in the *F.* From early times the common law rule was relaxed in favour of the principle that the circumstances of the annexation might show an intention in the parties to the contrary of the common law presumption. The degree and object of the annexation became all-important, and the rule became estab. that whatever chattel was annexed merely for its more complete enjoyment and use as such could be removed, but that where the purpose of the annexation was the improvement of the freehold, the chattel was irremovable. This obviously did not go far enough. However much a tenant for life under a marriage settlement may desire to improve the freehold, no thought could be further from the mind of a trade tenant, or, indeed, any tenant having no sort of relation other than contractual with the freeholder. Consequently the law, in its relaxation of the old doctrine, on grounds of public policy, in favour of ornamental *F.*, *F.* for convenience, trade *F.*, and *F.* for business purposes, proceeded rather on the principle that what could be removed without material injury to the freehold was removable by the lessee or tenant in the absence of special stipulation to the contrary. Much greater indulgence, however, is and has always been extended to the case of trade than to merely ornamental *F.*, and that greater indulgence is expressed in the orthodox rule that to take away the right to remove, the probable damage to the freehold must be so great as practically to destroy it. In the case of ornamental and domestic *F.*, the rule appears to be that removal will only be allowed if little or no damage be thereby caused to the freehold or to the fixture itself. The common law doctrine has also been relaxed by a number of statutes in the case of agric. *F.*, but this was a much more belated concession to the claims of natural justice. In connection with these relaxations, it is to be noted that the

above exceptions are construed more or less strictly according as the dispute is between (a) heirs and executors of the same owner; (b) executors of the tenant for life or tenant in tail (*see* *ENTAIL*), and the remainderman or reversioner; and (c) landlord and tenant. The law is strictly construed in favour of the inheritance in class (a), but it is relaxed in class (b) in favour of the limited owners, while in (c) the greatest indulgence is extended to tenants.

A more detailed reference may now be made to the law of *F.* as between landlord and tenant. A tenant may remove his *F.* only during the subsistence of his term unless expressly allowed to do so subsequently. Landlords' *F.* include those put up, not only by the landlord himself, but by any person other than the tenant, and such as have been put up but may not be removed by the tenant. It is usual, however, in leases to specify in a schedule not only the *F.* already on the premises or land, but such additions by the tenant as he may not remove even if he does hereafter make them. There is not a little confusion in the law as to landlords' and tenants' *F.* It is by no means clear what, in the absence of express stipulation, is the test of removability. As stated in the accepted text-books, the rule is that, however large the structure or thing may be, however solid or substantial, it is removable if it is so constructed as not in fact to be fastened to or let into the freehold. From one point of view this principle of the degree of physical annexation may be looked upon as no more than a test of the probable damage resulting from the removal. This reversion to the root principle of the law of *F.* involves, in effect, the abandonment of all the concessions so painfully won at the expense of the freeholder. This conflict of principle, however, works less confusion than may be imagined, and for 2 reasons: (1) contracts are generally so drawn as to provide for all eventualities; and (2) a great number of empirical exceptions to the auct. doctrine enable one in a moment to refer to one or other of them the great majority of chattels annexed to land or buildings, e.g. barns, mills, sheds, etc. Erections on blocks, rollers, pattens, or plates, the whole resting upon brickwork, but not united to the land or building by mortar or nails, are removable by the tenant. The decided cases also show that even if the structure is erected on a brickwork foundation let into the soil with uprights rising out of the brickwork, it is removable provided there be no actual fastening. Consistently with these decisions, stills set in brickwork have been held irremovable, but not vats merely supported by and resting on brickwork and timber. *Inter alia*, the following things of ornament or convenience are removable by the tenant: cornices, beds fastened to the walls or ceilings, furnaces and coppers, cupboards fixed with hold-fasts, bookcases screwed to the walls, clock cases, hangings, tapestry, marble chimney-pieces, wash-tubs and fixed water-tubs, grates, stoves and ranges, ovens, pier

glasses nailed to the walls, window-blinds, wainscot fixed by screws, and iron backs to chimneys. The following have been held irremovable: verandas the lower part of which is attached to posts embedded in the soil; conservatories erected on brick foundations affixed to or communicating with rooms in a dwelling-house; and greenhouses fixed with mortar or nailed to foundation walls of brickwork. It is to be noted, however, that some of these latter structures would be removable, despite the degree of their physical annexation, if they were erected for trade or business purposes. In regard to a tenant's trade F., the cases show that the following, *inter alia*, may be removed: salt pans, vats, chimneys, machinery, tables, steam- and fire-engines. It is clear that the removal of some of these Trade F. would result in not a little damage, but the difficulty in point of principle is got rid of by creating the exceptions in spite of it. In a contract between landlord and tenant it is desirable, especially from the tenant's point of view, to insert clauses in his lease expressly limiting the effect of the *pro forma* clause to 'deliver up the premises at the end of the term *together with all fixtures*.' The effect of a covenant (q.v.) to deliver up premises and all F. belonging thereto, *without further explanatory words*, has been construed to mean that the tenant's F. are to be delivered to the landlord as well as other F. Consequently, to guard his own interests, the tenant should always put in a proviso expressly excepting his own F. The right of a tenant to remove F. does not extend beyond the subsistence of his term, unless power be expressly given him to enter and remove them after the expiration of the lease.

Agric. tenants were not allowed to remove their F. until 1851, when such F. as were erected with the landlord's written consent were allowed to be removed, provided no injury were done to the freehold, and a month's notice to the landlord of intention to remove were given, and provided also the landlord did not elect to buy the F. The Agricultural Holdings Acts, 1875-83, went further and allowed removal even though the erection was without the landlord's consent. The right of a tenant to remove agric. F., for which he is not by statute or otherwise entitled to compensation, and which have not been erected in place of some F. belonging to the landlord or in pursuance of some obligation to the latter, is subject to these conditions: (a) before removal all arrears of rent must be paid and all other obligations to the landlord fulfilled; (b) no avoidable damage to any other building or part of the agric. holding must be done; (c) such damage as has been unavoidably occasioned must be made good; (d) 1 month's notice must be given; and (e) any dispute as to the value where the landlord elects to purchase is to be settled by arbitration. Under the Agricultural Holdings Act, 1948, the tenant may, within a reasonable time after the expiration of his term, remove F. which he has

erected, unless the landlord chooses to take them over at a valuation.

For a full list of chattels held to be removable by a tenant, see *Woodfall on Landlord and Tenant*. See also LANDLORD AND TENANT; EXECUTOR; CONTINGENT REMAINDER; REVERSION.

Fjord, see FJORD.

Flabellifera, or Fan-bearer, name given to a certain order of isopods. These particular isopods have tail-fans at their extremities, formed by the end-piece or telson and the last pair of appendages. Within this tribe there are many varieties or families, and one classification is into parasitic and non-parasitic F. In the former div. come *Cirolana* and *Conilera*, whilst the gribble or *Limnoria ligorum* is one of the most important in the latter. See also GRIBBLE.

Flabellum (plural, -la), a ceremonial fan. (1) Two F. are carried in papal processions and stationed behind the papal throne. They are adorned with ostrich feathers. In 1902 new F. were presented to Leo XIII by Mrs J. Drexel of Philadelphia, in exchange for the old ones, now preserved in the museum of Pennsylvania Univ., U.S.A. The papal F. are thought by some to be derived from (2) the pair of sacramental fans once used in the sanctuary at Mass to keep flies away from the sacred elements. Records exist of their use in St Paul's Cathedral, London, York Minster, and Rochester Cathedral, and generally in Europe, but their use has been discontinued in the W. since the 14th cent. In the Oriental Christian liturgies F., called in Greek *Rhipidi*, are still used at Pontifical ceremonies, and are placed one at each side of the sanctuary.

Flaccus, Gaius Valerius (d. c. AD 92), Rom. poet, author of *Argonautica*, which was rediscovered by Poggio Bracciolini in 1416, and first printed in Bologna in 1472. F. was known to Martial, who urges him in one epigram to give up poetry for the more lucrative profession of law. The poem has many purple patches, and is disconnected, sometimes obscure, and not infrequently spoilt by the pedantry of the writer. Eight cantos only have come down to us. There is an ed., with trans. by J. H. Mozley, in the Loeb Library, 1934. See W. C. Summers, *A Study of the Argonautica*, 1894; H. E. Butler, *Post-Augustan Poetry*, 1909.

Flaccus, Lucius Valerius, Rom. soldier. As consul with Marius in 100 BC he helped to put down the revolt of Saturninus. Appointed consul for the 2nd time in 86 BC, he was sent against Mithridates, but was murdered by his own troops at the instigation of his legate Fimbria.

Flaccus, Marcus Fulvius (d. 121 BC), Rom. democrat, belonged to an illustrious patrician family, but identified himself with the Gracchan or popular party. On the death of Tiberius Gracchus (133), he was appointed one of the 3 commissioners to carry out the agrarian reforms. His proposal during his consulate of 125 that all allies should have the Rom. citizenship led indirectly to the plebeian revolt known

as the Social war. The senate, after making 2 unsuccessful attempts to banish him from Rome, was finally relieved of its hot-headed opponent by the assassination of F. together with Gaius Gracchus.

Flaccus, Quintus Horatius, see **HORACE**.
Flacius (or **Flach**), **Matthias** (1520-75), whose proper name was **Wlach** (known in Croatian literature as **Matija Vlačić Ilir**), and who was surnamed **Illyricus**, b. Albona, Istria, a follower of Luther; led so stormy a life that the vol. and merit of his writings are remarkable. He studied in Venice, Basel, and Tübingen, and in 1541 taught Greek and Hebrew at Wittenberg. He suffered from spiritual depression and despair, but Luther (q.v.) drove away his melancholy and doubts and made him an enthusiastic Protestant reformer. The siege of Wittenberg forced him to leave the city (1547), and on his return he was soon banished again because of his vehement opposition to Melancthon. His enforced wanderings carried F. to Magdeburg, Jena (1557-61), Regensburg, Antwerp, Strasburg, and Frankfurt, where he d. in extreme poverty. His *Magdeburg Centuries* is the first great list. of Protestantism, whilst in his *Catalogus Testium Veritatis*, 1556, *Clavis Scripturae Sacrae*, 1567, and *Glossa Compendiaria in Novum Testamentum*, 1570, he proves himself the first exponent of scriptural hermeneutics. See life by W. Proger, 1850-61, and W. Nigg, *Kirchengeschichtsschreibung*, 1934.

Flag: 1. In botany, the popular name of 2 species of Iridaceae found in Great Britain. *Iris pseudacorus*, the yellow or water F., grows in marshes and ditches. This name is also given to the tall blue irises of the U.S.A., *I. versicolor*, *I. prismatica*, etc.; and with a qualifying adjective to sev. other similar plants, *Gladiolus segetum*, the corn F., *Acorus calamus*, the sweet F., etc.

2. Piece of cloth attached to the end of a staff, serving as a national or local emblem, or used for naval and military purposes, or for signalling. It originated from the representations of various animals and other objects that ant. nations were wont to use for similar purposes. Thus the Romans first used the manipulus, a wisp of straw or fern attached to a pole, which served as the rallying-point of the soldiers. This was succeeded by the figure of animals, such as the eagle, wolf, horse, etc., of which the eagle alone survived until the days of the empire. The first Rom. flag was apparently the vexillum, the standard of the cavalry, a square piece of cloth attached to a cross-bar on the end of a gilt staff. (See also **LABARUM**.) One of the earliest forms of F.s was the gonfalon (q.v.) or gonfalon (from Middle High Ger. *gund*, battle, and *fano*, flag), a square or oblong piece of cloth, sometimes with streamers, attached to a cross-bar or fixed in a frame in which it could turn. The gonfalon of William the Conqueror bore a gold cross on a white ground with a blue bordure.

The pennon (Lat. *penna*, a wing) was the ensign of the medieval knight bachelor

and was a tapering F. forked at the fly, exhibiting the arms or badge of its owner. The pennoncel or pencil was a small streamer, triangular in form, wide at the staff, and pointed at the fly, carried by the esquires and bearing the cognisance of their leaders.

The banner was a rectangular F. borne by nobles of the rank of knight banneret and upwards, and displaying the owner's coat of arms. The standard was a large, long F. tapering towards the fly and slit at the end. It varied in size according to the owner's rank and displayed his badge. In addition, the various trades and guilds also had special F.s, which when necessary were borne to battle.

The diversity of F.s carried in medieval armies had necessarily to be replaced by greater uniformity when standing armies were introduced. At first each company of the regiment had its distinctive colour, but in the reign of William and Mary the number of F.s in the regiment was reduced to 3, and later by Queen Anne to 2, the royal and regimental colours, which number is still maintained. The foot guards have, however, remained unaffected by these innovations, and still retain a separate colour for each company. The regiments of household cavalry have each 3 regimental colours besides the royal standards, the dragoons have the usual 2 colours, while the lancers and hussars have no colours.

The use of F.s is far more extensive on sea than on land. Formerly ships sailed under the individual F.s of their captain, or the port of origin, but now they sail under the national colours or house F.s. Usually the ruler of a country has a F. personal to himself known as the royal standard, though it is generally rectangular like the banner. The royal standard of the Brit. Isles bears the quartered arms of England and Scotland, and formerly Ireland. It is flown at the place where the sovereign resides and on certain occasions of national celebration. The union F. was introduced in 1606 after the union of England and Scotland, and at first bore the crosses of St George and St Andrew. It was ordered by James I to be borne at the maintop of all Brit. ships, except ships of war, which bore it upon their jack-staff at the end of the bowsprit, whence it is erroneously termed Union Jack. With this F. was afterwards merged, at the union with Ireland in 1801, the cross of St Patrick, a red saltire on a white ground, and the F. thus formed has become the national F. It is still used as the man-o'-war's jack, and is also flown at the main-trunk of the admiral's vessel. It also appears on all ensigns. The ensign is the F. flown upon the ensign staff of every vessel indicating its nationality. Formerly the Brit. red, white, and blue ensigns were distinctive of the red, white, and blue divs. of the fleet, but in 1864 these divs. were done away with and new ones allocated to the 3 ensigns. The white ensign, a white F. bearing the cross of St George and with the upper corner near the staff occupied by the union device, is the

exclusive F. of the Royal Navy and the Royal Yacht Squadron, and may be flown by no other vessel. The red ensign is a red F. with the union device in the upper quarter near the staff and is flown by Brit. merchant vessels and ships not belonging to the navy. The blue ensign is a plain blue F. with the union device in the upper quarter next the staff, and is flown by the Royal Naval Reserve, and by certain yacht clubs. The union F. and the blue ensign are also used with various additions to denote various officials or depts. Thus dominion war vessels fly the blue ensign with the dominion badge in the fly, while the F. for the colonies is the union F. with a white escutcheon in the centre, which bears the arms of the respective colony. The F. of the Lord High Admiral is red with a golden anchor and cable, the admiral's F. a cross of St George, red upon white ground, flown at the mainmast. The vice-admiral flies at the foremast a similar F., but with 1 red ball in the upper quarter near the staff, and the rear-admiral flies at the mizzen-mast the same F. with a red ball in each of the quarters near the staff. A commodore flies a broad pennant, a swallow-tailed F. tapering towards the fly, and bearing the St George's cross, while other officers commanding ships of war fly the long pennant, a very long, narrow, and tapering F. bearing a red cross on white ground.

The Eire national F. has 3 stripes, green, white, and orange, of equal width, the green being nearest the pole.

The F. of the Union of South Africa was altered from the Union Jack and defined by an Act of the Union Parliament in 1927. It now comprises both the Union Jack, to denote the association of the union with the other members of the group of nations constituting the Brit. Commonwealth, and the national F., the design of which is 3 horizontal stripes of equal width from top to bottom, orange, white, blue. In the centre of the white stripe the old Orange Free State F. hangs vertically, spread in full, with the Union Jack adjoining horizontally, spread in full towards the pole, and the old Transvaal Vierkleur adjoining horizontally spread in full away from the pole, equidistant from the margins of the white stripe. The Australian national F. is blue with the stars of the Southern Cross in white, and the union F. in the top corner nearest the pole. The Canadian national F. is red with the dominion emblem in the centre and the union F. in the top corner nearest the pole. The New Zealand (Merchant) F. is red with the Southern Cross stars in white and the union F. in the top corner nearest the staff. The national F. of the dominion of India is a horizontal tricolour with bands of deep saffron, white, and dark green in equal proportions; on the centre of the white band is an Asoka wheel in navy blue. The national F. of Pakistan is dark green, with a white vertical bar at the mast, the green portion bearing a white crescent in the centre and a 5-pointed heraldic star.

The Fr. F. is the tricolour of blue, white, and red in vertical bars adopted during the revolution, and is used both in the navy and the mercantile marine. Before the revolution the royal standard was a blue F. bearing 3 *fleurs-de-lis*. During the 2 empires the imperial standard was the tricolour, powdered with golden bees, and having the imperial eagle upon the white bar.

The Ger. imperial standard had a black iron cross with broadening arms, known as the cross patée, upon a gold field, each quarter of which was charged with a black crown and 3 black eagles, while the centre of the F. bore a gold shield, surmounted by a cross and surrounded by a collar of the black eagle. Within the shield were the imperial arms. The naval F. had a white ground bearing a black, white-edged cross, in the centre of which was the Prussian eagle in black on a white circular ground. The upper canton next the staff was divided into 5 horizontal bars of black, white, and red, upon which rested the black, white-bordered iron cross. This standard during the Nazi regime of Hitler was replaced by a black swastika within a white circle placed in a red ground.

The old Austrian imperial standard had a golden field, bearing the double-headed eagle of the empire with an indented border of gold, silver, blue, and black. After the union with Hungary the combined F. of Austro-Hungary consisted of 3 horizontal bars of red, white, and a bar divided vertically into 2 half bars of red and green, with 2 shields over the centre white bar, containing the arms of Austria and Hungary respectively. After the First World War the Austrian F. design was changed to 3 horizontal bars of red, white, and red.

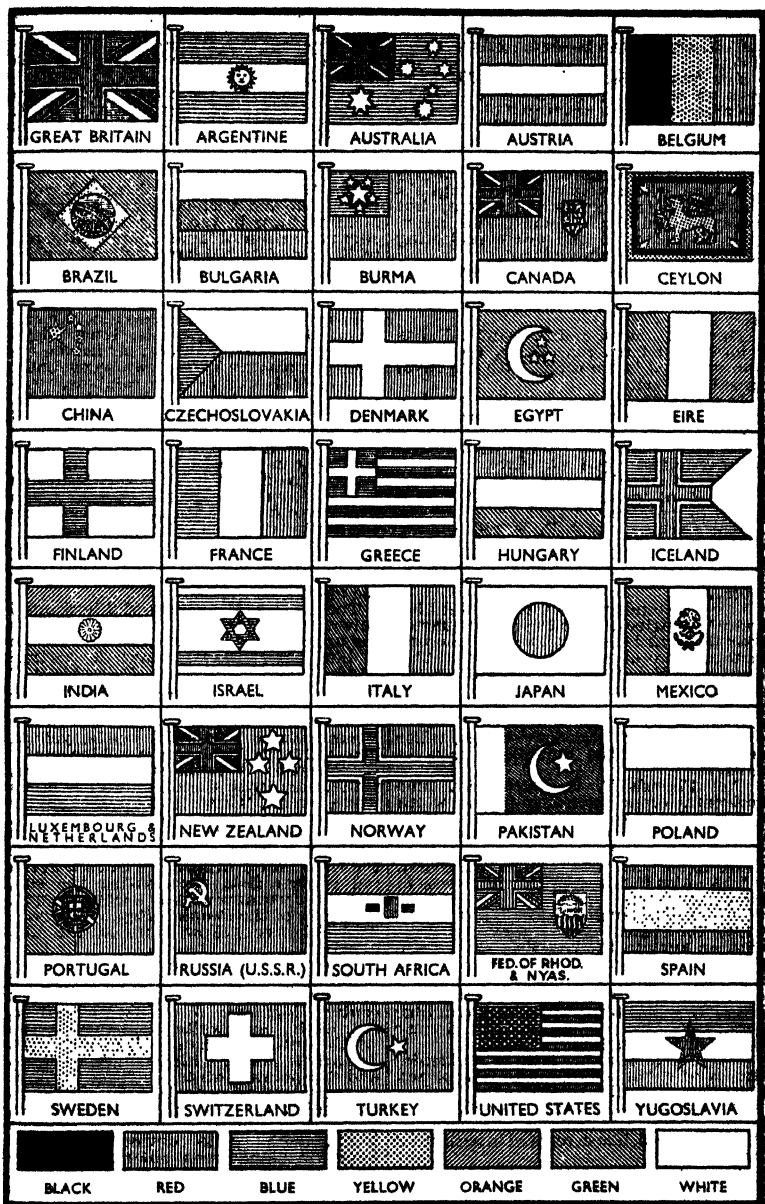
The old Russian imperial standard was yellow, bearing the arms of the empire, and the naval F. was simply a blue diagonal cross, or saltire, on a white ground. The Russian or Soviet F. is red with a yellow sickle crossing a yellow hammer, surmounted by a 5-pointed star.

The Hungarian F. now has 3 horizontal bars, red, white, and green, with the Hungarian arms, without supporters, in the centre.

The It. royal standard until the country's adoption of a republican form of gov. was a white F. with blue border, bearing the arms of the king of Italy. The national F. has 3 vertical bars of green, white, and red.

The F. of the Vatican City State, or Papal F., consists of 2 vertical stripes, yellow and white. The latter is charged with the tiara in its proper colours, surmounting 2 crossed keys (1 gold and 1 silver) tied together with a red cord.

The old Sp. standard bore the royal arms and the naval F. had red, yellow, and red horizontal bars, the middle bar bearing, near the staff, a circular shield with the arms of Leon and Castile surmounted by a crown. The mercantile F. is yellow with 2 narrow horizontal red bars. The republican F. in the Civil war



SOME NATIONAL FLAGS

had 3 equal bands—red, yellow, and violet.

The Portuguese F. (since 1910) is of dark green (next pole) and bright red in the proportion of 5 green to 8 of red. On the red and green ground, half in each, is a shield, and on it spheres and castles.

The Norwegian F. is red, with a blue cross bordered with white, the Swedish F. is blue, with a yellow cross. Both F.s are square for mercantile vessels, but swallow-tailed for standard and navy, with the arm of the cross projecting between the tails and pointed.

The Belgian naval and mercantile F. has 3 vertical bars, black, yellow, and red. The standard is the same, with the royal arms in the centre.

The Dutch naval and mercantile F. has 3 horizontal bars, red, white, and blue. The standard is the same, with the royal arms in the centre.

Luxembourg's F. is red, white, and blue.

The Dan. F., known as Dannebrog, is red, with a white cross, swallow-tailed for the navy, and rectangular for the army. The swallow-tailed royal standard bears a square in the middle with royal arms.

The F. of Iceland is blue, with white-bordered red cross.

The Turkish naval F. is red with a white crescent and an 8-pointed star near the staff. The mercantile F. is green with a white crescent upon a red circle in the centre.

The Gk standard has 9 horizontal blue and white stripes, while the upper quarter near the staff is blue, with a white cross, in the centre of which is a crown. The mercantile F. is identical but without the crown.

The Rumanian F. has 3 vertical bars of blue, yellow, and red.

San Marino, 2 horizontal bands, white and blue, with the republican arms in centre.

The Finnish F. is white with blue horizontal cross extending to the width and length of the F.

The Polish F. consists of 2 horizontal stripes, white and red, of equal width, white uppermost, with the arms of Poland.

The Swiss F. is red, with white cross in the centre.

The Czechoslovak F. has a blue triangle within the square extending from the pole, with an apex in the centre of the F., the top portion of which is white and the remainder red.

The Yugoslav F. has 3 horizontal stripes of equal width, blue, white, and red, blue uppermost, in the centre a red star bordered with yellow.

The Bulgarian F. has 3 horizontal stripes of equal width, white, green, and red, with the white uppermost.

The Albanian national F. is red, with a black double-headed eagle. The mercantile F. is red, black, and red in horizontal stripes.

The U.S.A. F., known as 'Old Glory,' consists of 13 red and white stripes, representing the original number of states, with the upper inner quarter blue, bearing 1 star for every state actually in the union.

The number of stars is now 48. Two stars were added in 1912 for Arizona and New Mexico.

Cuban national, oblong with red triangle next to staff extending one-third of F., containing a 5-pointed star in centre, the rest of the design being 5 horizontal stripes of equal width, blue and white alternately with blue uppermost.

The Mexican F. is a tricolour with green, white, and red vertical bars, bearing the Mexican arms in the central bar. Costa Rica: 5 horizontal bands, blue, white, red, white, blue (the red band twice the width of the others). Dominican rep.: red and blue, with white cross. Guatemalan: 3 vertical bands, blue, white, blue. Haitian: 2 horizontal bands, blue and red. Nicaragua: 3 horizontal bands, blue, white, blue with the republican arms on the white, displaying 5 volcanoes, surmounted by cap of liberty under a rainbow. Salvador: 3 vertical bands, blue, yellow, red. Panama: 4 diagonal squares—3 white, 1 blue, and 1 red, with the 5-pointed blue star in the middle of one white square and a red star in the other white square.

The Brazilian F. is a green F. bearing a yellow rhombus. In the rhombus is a blue circle dotted with stars and bearing the motto 'Ordem e progresso.'

The Argentine F. has 3 horizontal bars, blue, white, and blue, for the mercantile service, and a sun upon the white bar for the navy.

The Chilean F. consists of 2 horizontal halves, white and red. Near the staff in the upper bar is a 5-pointed white star on a blue ground. Peruvian: 3 vertical bands, red, white, red. Colombian: 3 horizontal bands, yellow (twice the width of the others), blue, red. Bolivian: 3 horizontal bands, red, yellow, green. Venezuelan: 3 horizontal bands, yellow, blue, red (with 7 white stars on blue band). Paraguayan: 3 horizontal bands, red, white, blue (with the republican arms on white band). Uruguayan: 4 blue and 5 white squares (surcharged with rising sun, next flagstaff). Ecuadorian: 3 horizontal bands, yellow, blue, and red (yellow twice the width of the others). The Jap. F. is a red central disk, representing the sun, with red spreading rays on a white ground.

The F. of the People's Rep. of China is red with five yellow stars in the first quarter.

Other F.s are: Persian (man-of-war): white, bordered with green (top) and red (bottom), with arms—lion and sun—in centre. Siamese: 5 horizontal stripes, red, white, blue, white, and red, of equal width, with an elephant as centre emblem. Egyptian: green, with 1 white crescent, and 3 5-pointed white stars, arranged as an equilateral triangle, between the horns. Ethiopian: 3 horizontal bands, green, yellow, red. Afghanistan: green, red, and black, with white device in centre. Saudi-Arabian: green oblong, white device in centre: 'There is no God but God, Mahommed is the Prophet of God,' and a white scimitar beneath the lettering. Moroccan sultan's F. is red, with green pentagram (the seal of Solomon). Syrian:

black, white, and green, with white stars. Lebanon F. is blue, white, and red, with a cedar of Lebanon on white stripe.

A white F. is the F. of truce, a yellow F. denotes quarantine, a red F. mutiny, and a black F. piracy. For the use of F.s for signalling, see **SIGNALLING**.

See G. C. Hounsell, *Flags of all Nations*, 1874; H. H. Horner, *American Flags*, 1910; W. J. Gordon, *Flags of the World*, 1928; G. Perreux, *L'Origine du drapeau rouge en France*, 1930; and E. H. Baxter, *National Flags*, 1934.

Flag-captain, captain of the admiral's ship in any squadron or detachment of the navy. He is commonly the admiral's nominee.

Flag-lieutenant, naval officer who transmits by signal or word of mouth the admiral's commands to the various ships. He is attached to his admiral exactly as in the army the aide-de-camp is to his general.

Flag-officer ranks above a captain in the Brit. Navy, and is usually a rear-admiral, vice-admiral, or admiral. He is so called because he is privileged to hoist a flag at his mast-head instead of a pennon, the flag being invariably a red St George's cross on a white ground. A rear-admiral carries it at the mizzen, a vice-admiral at the fore, and an admiral at the main. To F.s are given the commands of naval stations at home, and of fleets at home or abroad, whilst they may be entrusted with the surveillance of any important dockyard. They are appointed by the Admiralty at the sovereign's pleasure.

Flag-signalling, or **Flagging**, see **SIGNALLING** and **SEMAPHORE**.

Flageolet, see **RECORDER**.

Flagship, so called because it flies the admiral's flag. It carries the admiral and his staff. The F., however, remains under the command of her captain.

Flagstad, Kirsten (1895-), Norwegian dramatic soprano, b. Hamar, studied singing in Oslo and Stockholm. First appeared at the age of 18 and before 1933, when she was engaged for small parts at Bayreuth, she sang a great variety of serious and comic operatic parts in Scandinavia. She then began to specialise in Wagner, singing Sieglinde at Bayreuth in 1934, Isolde in New York in 1935, and that part as well as Senta and Brünnhilde in London in 1936-7. After that she was the finest, most noble Wagnerian soprano for nearly 20 years, and she wisely retired when still at the height of her powers.

Flagstaff, in of Arizona, U.S.A., the cap. of Coconino co., situated 84 m. E. of Prescott junction, in a large stock-raising dist. There are lumber mills, excellent yellow pine being produced. Beans, oats, and potatoes are the agric. products. In the city are the Lowell Observatory and the H.Q. of the Coconino Forestry Service. F. is a tourist centre in a scenic region (national parks, Indian reservations). Pop. 7663.

Flagstaff, pole or staff upon which a flag is hung; a F. on land is more often a tall mast, permanently fixed, while that on

board ship is generally the masthead, or at the stern.

Flagstones (geology), thin beds of sandstone which lend themselves to quarrying in slabs suitable for paving stones or rough slating. In the N. of England a flagstone quarry is synonymous with a slate quarry. The best F. are quarried from the Orcadian or Middle Old Red sandstone of Caithness and Orkney. Other good F. are the Carboniferous F. of the N. and midland cos. of England; while certain Jurassic rocks also yield good F.

Flahaut de la Billarderie, Auguste Charles Joseph, Comte de (1785-1870), Fr. general and diplomatist, the son of Mme de Souza, took the name of her first husband, F. de la B., who was executed in the Reign of Terror (1793), although it is generally believed that Talleyrand was his father. From 1800 till Waterloo he was continually in active service, fighting at Landbach (1805), Friedland and Leipzig (1813), and having served with distinction in the Russian campaign (1812). His liaison with Hortense de Beauharnais, queen of Holland, was the result of a devoted attachment. Having taken part in an unsuccessful attempt to put Napoleon II on the throne, he finally retired to England, where he married Margaret Elphinstone, afterwards Baroness Keith in her own right.

Flambard, Ranulf, or Ralph (d. 1128), chief justiciar in the reign of William Rufus; he was a Norman of humble birth. He became the king's chief adviser, and soon made himself hated by clergy and laity alike by his devices for enriching his master's exchequer. A favourite means was arbitrarily to keep a see vacant that the king might pocket the revenues. In 1099 he became bishop of Durham. When Henry I came to the throne he was imprisoned in the Tower, but escaped and fled to Normandy. He took part in Robert's rebellion, but was pardoned after Tinchebrai and regained his see. He completed the nave of Durham Cathedral.

Flamborough Head (O.E. *Flæmburg*; Domesday Book, *Flaneburg*; derivative from *Flæin's burg*), on the coast of Yorks, England, situated 2 m. E. of Flamborough. An anct Brit. earthwork, misnamed Danes' Dyke, runs across F. peninsula, ending in the Head. F. H. is composed of limestone cliffs, and extends a considerable distance into the sea, rising in places to a height of 400 ft. Formerly beacons were lighted on the summit, and now a lighthouse, the light of which is visible at a distance of 21 m., stands 214 ft above high-water mark.

Flamboyant (from O.F. *flambe*, a flame), the last phase of Fr. Gothic architecture, was so called because the flaring lines of the window-tracery resemble flames in shape. The style is finicky in detail, and characterised by elaborate interpenetration of mouldings. See **FRENCH ARCHITECTURE**.

Flame can be defined as a gas which is temporarily luminous as a consequence of

chemical action (contrast Incandescence). The common distinction which is drawn between luminous and non-luminous F.s is not scientific, and can only be taken as representing a rough estimate of the degree of luminosity. F.s can also be induced by the medium of electricity; rapidly alternating high-tension discharges in air will produce an oxygen-nitrogen F., which cannot be distinguished from a F. produced by ordinary means.

Structure of Flames.—The term structure, as applied to F.s, is somewhat vague, and different accounts are given as to the number of differentiated parts in various F.s. The shape of F.s as a rule is that of a hollow cone. The gas which is unburnt forms the interior of the cone and the other gas surrounds it in the cases of F.s produced simply by the reaction of 2 gases. The F.s of the compounds of carbon, and especially of hydrocarbons, have received more attention and been more studied than other kinds, as is natural, owing to their extensive use and application. The cone of F. is simple when such elementary gases as oxygen and hydrogen only unite, but consists of 2 or more parts in more complex cases. At the base of a candle F. is a blue portion which forms the rudiment of an inner cone of combustion. When no air is mixed with the gas before coming out of the burner, no clear differentiation of the structure can be observed in a carbon-monoxide F. Hydrogen, when burnt in air at ordinary pressure, has very little luminosity or colour. The F. of cyanogen is peculiar in structure, consisting of a shell, almost crimson in colour, surrounded by a margin of bright blue. These 2 colours mark 2 stages in the process of combustion, as the carbon of the gas is oxidised first to carbon monoxide and then to carbon dioxide. If the gas of a hydrocarbon is supplied with sufficient air before leaving the burner, as in the case of the blast blow-pipe, the result is a sheet of undifferentiated F., blue in colour.

Luminosity of flames has sev. causes, of which the presence of solid incandescent matter in the F. is one. In some cases the solid is put into non-luminous F., which it renders luminous, as in the case of the incandescent gas mantle and the lime-light. In the candle, oil, and coal-gas F.s, small particles of carbon, set free by the decomposition of the hydrocarbons, form the chief cause of luminosity. In many F.s, however, solids are absent, and the luminosity is still great. Such are the F.s of oxygen and hydrogen under pressure, carbon disulphide, nitric oxide, etc. With an ordinary hydrogen F. luminosity is diminished as the purity of the hydrogen is increased and as the air is freed from dust. High temp. may increase the luminosity of F.s, in which are no solids, as in the case of coal-gas in a regenerative burner, or the same result may be obtained by increasing the density of the F. gases by pressure, as in the case of a hydrogen and oxygen F. The Bunsen burner is an illustration of the converse of the above process. Combustion in this case is rendered more complete by the addition of

air to the inside of the F., but the pressure is reduced by the consequent admixture of nitrogen and oxygen, and the luminosity is thus lessened. So in the case of an ordinary gas F., if instead of air, nitrogen, or carbon dioxide is admitted to the interior of the F., the latter can be rendered practically non-luminous. The chemical energy required for the production of F. may be liberated in the process of either decomposition or combination of the component gases; the latter is the more usual, but gun-cotton is an instance of the former, as it gives off a F. in the process of decomposition. F. temps. have been measured in many ways, one of the best being the use of a platinum and platinum-rhodium thermocouple. The normal Bunsen F. is about 1570° C. at its hottest point, the oxyhydrogen blowpipe 2420° C., the acetylene F. 2550° C., and the oxy-acetylene blowpipe 3500° C. These may be compared with the temp. of the electric arc, which is about 3750° C.

Flame-flower, or Red-hot Poker, popular name of the various species of *Kniphofia*, a genus of Liliaceae. Some are hardy plants, such as *K. uvaria* and varieties, for cultivation in a light soil, and bear vivid scarlet flowers. Originally they came from S. and E. Africa.

Flame-thrower, military weapon, used in Byzantium, mainly as a siege and naval weapon, by special troops known as *siphonistai* (see GREEK FIRE). In the First World War the weapon was first introduced by the Germans, notably at Verdun (*Flammenwerfer*). Brit. and Fr. portable (infantry) and static copies were developed. The charge is a mixture of inflammable oils, the propellant compressed air or gas. Flame-throwing tanks employed by the Italians in the Abyssinian campaign of 1935 consisted of a trailer-mounted F., towed by a light tank. F.s were used fairly extensively in the Second World War. The Brit. 'Life Buoy' was carried by the individual soldier and the 'Wasp' was mounted in a Bren carrier. Flame-throwing armoured vehicles were the 'Cockatrice,' the 'Bobolisk,' and the 'Crocodile'—the last an adapted Churchill tank. See Sir D. Banks, *Flame over Britain*, 1946; A. Wilson, *Flame-thrower*, 1956.

Flamen (from Lat. *flare*, to blow the altar fire), a Rom. sacrificial priest. The chief or *maiores* were the *F. Dialis* (priest of Jupiter), *F. Martialis*, and *F. Quirinalis*, who were always patricians; the other 12 were plebeians and consequently known as *minores*. The chief function was daily sacrifice, and on 1 Oct. the *maiores* offered oblations on the Capitol to Fides Publica. A woollen mantle, called the *laena*, a white conical hat (*aper*), and a laurel wreath or olive branch were their insignia. The *F. Dialis* was hedged in by many restrictions; e.g. he might never leave the city for a night, or look at an army, or mount a horse. His wife, known as the *Flaminica Dialis*, helped him with his duties.

Flamingo (from Lat. *flamma*, flame), name given to a genus of beautiful birds

belonging to the family Phoenicopteridae, of the order Oiconiformes. They inhabit most of the countries bordering on the Mediterranean, a few individuals occasionally traveling as far as the Brit. Isles and N. Germany. By its long neck and legs, as well as by its internal anatomy, the F. gives evidence of an ancestral connection with the storks. There are 6 existing species of the *Phoenicopteridae*, and these constitute the true F.s. *Ph. roseus*, the European F., common in the S. of France and in Spain, has plumage of a pinkish-white, with scarlet wing coverts; the beak is rosy-red at the base and black at the tip; and the legs and feet are light vermillion. *Ph. ruber*, the Amer. F., has an entire plumage of vermillion. Large flights of these birds, travelling, as they



E.N.A.

FLAMINGOES IN A MEXICAN SWAMP

do, over the lakes, present a most beautiful spectacle. The F., though essentially a wader, is also a powerful swimmer. It feeds on small aquatic animals and water-plants. See E. Gallet, *The Flamingoes of the Camargue*, 1948.

Flaminian Way, see VIA FLAMINIA.

Flaminius, Titus Quinctius (c. 228-274 bc), Rom. gen. and statesman; consul in 198. In the following year he defeated Philip V of Macedon at Cynoscephalae and declared the independence of the Gk states. His genuine love of Greece and her culture enabled him to do important service in the E. between 192 and 183 bc, when he vanishes from hist. See the life by Plutarch.

Flaminius, Gaius, Rom. democratic leader and general. During his tribunate in 232 bc he granted a stretch of newly acquired land, 'ager Gallicus Picens', to the plebeians in defiance of the senate. Later he built the Circus Flaminius on the Campus Martius for the plebeians, and constructed the Via Flaminia. In 223 he gained a notable victory over the Insubres on the banks of the Addua, but in 217 he was slain at the battle of Trasimene.

Flammarion, Camille (1842-1925), Fr. astronomer, b. Montigny-le-Roi. He was entered in 1858 at the Paris Observatory as an astronomical student and worked for 4 years in the Bureau des longitudes, where he assisted in the compilation of a scientific nautical almanac. For some time he ed. the scientific columns of the *Sicile*, and soon became known as a popular lecturer on astronomy. In 1868 he made sev. ascents in a balloon in order to investigate aerial currents and the hygrometry of the atmosphere. Two years later he pub. an important work on the movements of celestial bodies, and in 1880 was awarded the Montyon prize of the Fr. Academy for his *Astronomie populaire*. In 1883 he estab. his private observatory—L'Observatoire Flammarion—at Juvisy-sur-Orge, and for some years devoted himself to work on the moon and the planets. One of his most important discoveries is that the rotatory movements of the planets are governed by the effect of gravity upon their various densities. In 1887 he founded the Fr. Astronomical Society. *Pluralité des mondes habités*, 1862, *Les Merveilles célestes*, 1865, *Voyages aériens* 1868, *Dans l'infini*, 1872, *Atlas céleste*, 1877, *Les Comètes, les étoiles et les planètes*, 1886, and *La Planète Mars et ses conditions d'habitabilité*, 1893, are some of his many pub. Towards the end of his life he became much interested in the question of immortality and pub. sev. curious books dealing with it.

Flamsdal, or Flaamsdal, valley of Sognog-Fjordane (q.v.) co., Norway, running from the head of Aurlandsfjord a S. arm of the Sognefjord (q.v.) some 10 m. S. to Myrdal. The vil. of Flåm, some 5 m. from the head of Aurlandsfjord, is a centre for tourists, and the whole area is notable for its magnificent mt scenery. A railway runs as far as Myrdal.

Flamsteed, John (1646-1719), b. Denby, near Derby, first Astronomer Royal of England. He showed a lively interest in the heavens while still a boy, and was delighted to find himself installed in 1676 in the Royal Observatory at Greenwich, then just completed. At first he was harassed by lack of funds, and supplemented his £100 a year by teaching and by taking holy orders, which enabled him to obtain the small living of Burstow, near Horley, in Surrey. Unfortunate bickerings with Sir Isaac Newton (q.v.), who depended on F. for data in support of his lunar theory, cast a heavy shadow over later years. F.'s name will always be honoured as the first great Brit. observer who estab. precise astronomy on secure foundations. F. undertook, firstly, the construction of a catalogue of the fixed stars more extensive and more precise than any then existing; secondly, the systematic observation of the sun, moon, and planets with a view to revising the theories of their apparent motions and to constructing tables from which their positions could be computed with the desired accuracy. As no assistance was provided by the gov. F. had to defray the cost out of his own

pocket. He introduced new methods into practical astronomy, many of them still in use to-day. In accuracy his observations far exceeded those of his predecessors or contemporaries; they were, in fact, the earliest observations from which the phenomenon of aberration (q.v.) was clearly deducible. The task, which he did not live to finish, was completed by the labours of Crosthwait and Shart, who had been his private assistants. The 3 vols. of F.'s *Historia coelestis Britannica*, 1725, contain a record of all his astronomical observations and also the *British Catalogue* of nearly 3000 stars.

Flanders (Flem. *Vlaanderen*, Fr. *Flandre*), former name of a co. of Europe, which in the 7th cent. was applied only to Bruges and its surroundings, but it later extended along the North Sea from the R. Scheldt to the straits of Dover and Calais. To-day most of the ter. lies in 2 provs. of NW. Belgium, E. F. and W. F.

History.—The country was originally inhabited by Celtic tribes, the Morini and Menapii, who were subjugated by Caesar's forces, and the land became incorporated with Rom. Gaul. In the early centuries AD F. was overrun by invaders, many of the Franks taking up their abode permanently. By the treaty of Verdun in 843 F. was assigned to Neustria, or W. Francia, under Charles the Bald. F., though virtually a suzerainty of France, was politically autonomous, being governed by the counts of F. The 1st count whose name is recorded in hist. is Baldwin I., *Bras-de-fer*, i.e. Iron-arm (840–79), the son-in-law of Charles the Bald. The early counts were very much occupied in guarding their lands from the attacks of predatory northmen, and in extending their own dominions. Baldwin III (d. 962) laid the foundations of F.'s future commercial and industrial prosperity by establishing the first weavers and fullers at Ghent, and by patronising the ann. fairs in the chief Flem. cities. Baldwin IV (988–1035) obtained Valenciennes in 1006 from Emperor Henry II, thus becoming a feudatory of the empire as well as of the Fr. crown. During the rule of Baldwin V (1035–67) the cos. of Alost (Aalst), Tournai, and Hainaut were added to the principality. The counts of the 11th and 12th cents. were zealous in promoting the industrial interests of the country. Count Philip (d. 1191), encouraged the development of the free tns, and conferred certain municipal privileges on a number of seaports. On his death the countships of F. and Hainaut, which had been separated during the rule of Baldwin VI, were now reunited. Baldwin IX (1194–1206), the founder of the Lat. empire of Constantinople, was succeeded by his 2 daughters, Johanna and Margaret. It was during this reign that France began to exercise great influence in the country, and attempted to deprive the people of many of their privileges. Philip the Fair invaded the country during the reign of Margaret's son, Guy of Dam-pierre. Together with his 2 sons and his

nobles Guy was taken prisoner, and F. estab. as a Fr. dependency. The Flem. burghers rose in insurrection, and under the leadership of Peter de Conynne, a master cloth-weaver of Bruges, routed the Fr. army at Courtrai (1302). The cities increased in power and wealth, and many of them were governed locally on democratic principles. The internal struggle for superiority between the chief cities often disturbed the country with civil war. In the middle of the 14th cent. Jacob van Artevelde was the virtual ruler of F., and persuaded his countrymen to make an alliance with Edward III of England in defiance of their count. In a plot Jacob was murdered (1345), and the count of F. Louis van Male came to power. The last resistance of the cities was broken at Ghent in 1349. Under Philip van Artevelde, Jacob's son, Ghent rebelled again, until he, too, was slain at Rosebeke (1382). By the marriage in 1369 of Margaret, the heiress to the countship, and of Philip the Bold, of Burgundy, the hist. of F. became intimately connected with that of Burgundy, until in 1477 F. became part of the Austrian Netherlands. The Flem. coms. still attempted to assert their rights in defiance of their rulers, but the Burgundian dukes, while promoting Flem. industry and trade, sternly repressed any revolts against their authority. In 1529 France was obliged to yield her right of suzerainty in favour of Austria, and in 1633 F. reverted to Sp. rule. From 1659 to 1713, by the treaties of the Pyrenees (1659), Aix-la-Chapelle (1668), Nijmegen (1678), and Utrecht (1713), S. portions of the country were assigned to France, under the name of Fr. F. By the treaty of Vienna in 1815 it was incorporated in the Netherlands. In 1830 the new kingdom of Belgium was formed, and the old name of F. was retained in the 2 provs., E. and W. F.

E. F. lies to the NW. of Belgium, extending to the neighbourhood of Antwerp. It has rich and fertile soil, being well watered by the Scheldt and the Lys. The chief tns are Ghent (the cap.), Sint-Niklaas, Alost, Eekloo, Dendermonde, and Oudenarde (qq.v.). The prov. is famous for its flax, and the inhab. manuf. cloth, paper, leather, etc. Market-gardening is carried on under excellent conditions. Area 1147 sq. m.; pop. (1955) 1,249,435.

W. F. borders the North Sea for about 40 m. Like its neighbouring prov., the country is flat and the soil very productive. Agriculture and cattle breeding are the chief occupations of the inhab. Flax, hops, and tobacco are cultivated. The pop. is also engaged in fishing and in weaving, spinning, lace-making, bleaching, etc. The chief tns are Bruges (the cap.), Ostend, Courtrai, Rooselare, and Ypres (qq.v.). Area 1248 sq. m.; pop. (1955) 1,032,170. *See also* BELGIUM; EAST FLANDERS; WEST FLANDERS.

See also BELGIUM; FLEMINGS IN ENGLAND; FLEMISH ART; (1914–18 campaigns); FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGN IN; for the 1939–1945 campaigns *see* WESTERN FRONT IN

SECOND WORLD WAR and FLANDERS, BATTLE OF (1940).

See P. Hamelius, *Histoire politique et littéraire du mouvement flamand*, 1894; F. de Baeker, *Contemporary Flemish Literature*, 1934; R. van Roosbroeck (ed.), *De Geschiedenis van Vlaanderen*, 1936-39, 1948; F. Baur, A. van Duinkerken, and others, *Geschiedenis van de Letterkunde der Nederlanden*, 1939-48; J. Denucé and J. A. Goris (ed.), *Vlaanderen door de Eeuwen heen*, 1932; J. A. Goris (ed.), *Belgium*, 1945.

Flanders, Battle of (1940), fought between 10 May and 2 June 1940, and begun with a simultaneous attack by the Germans on Holland, Belgium, and France. During these fateful weeks the Brit. Expeditionary Force, under Gort, advanced into Belgium, and fell back again when the Germans pierced the Fr. armies and the Belgians capitulated, and finally fought its historic retreat to Dunkirk, where 211,500 fit men, 13,000 casualties, and 112,500 allied troops were embarked. Gort, who was under the immediate orders of Georges, commanding the Fr. front of the NE., had no responsibility for the plan to meet a Ger. invasion of the Low Countries. There were strong arguments in favour of that which was adopted, the wheel to the Meuse-Dyle line. But its advantages depended on certain conditions, such as the capabilities of the Belgian Army and the mobility of the Fr. reserves, conditions which were not fulfilled.

When the Ger. attack was launched on 10 May the advance through Belgium was carried out successfully. On 15 May the Dutch Army capitulated. The excellent Fr. troops of the Seventh Fr. Army, who had rushed up to Holland, had to retire hurriedly on Antwerp. Sev. divs. of them were ordered to pass right across the communications of the B.E.F., and of their own First Army, and try to secure the disintegrating Ninth Army. This complicated move was successfully carried out on 18 May; but official dispatches record that it was too late. The divs. disappeared into the enemy maelstrom, and their leader, Gen. Giraud, arrived only to be captured. As for the B.E.F., which was not seriously attacked up to the night of 15 May, it was still conforming to the Dyle plan. But the enemy was moving ahead of schedule, and 16 May was the turning-point. The Germans had broken through on the Meuse and the Fr. S. flank was imperilled. Gort therefore asked for and obtained orders from Gen. Billotte, commanding the army group, to withdraw by stages to the Escaut. The withdrawal involved the abandonment by the Allies of both Brussels and Antwerp. On 18 May the enemy reached Amiens, and cut the lines of communication with ports S. of the Somme, and his strength of 5 armoured divs. made it certain that he would reach the Channel ports. The loss of the line of the Somme also cut off the arriving armoured div. (Brit.), which thus never came under Gort's effective command,

and also 5 battalions of the 12th and 46th Divs., together with the 51st Div., which was rushing back from the Saar. The gap in the allied line ought to have been closed by counter-attacks from N. and S., but the Fr. had not sufficient reserves, at their disposal. On 20 May orders were given to Gort to fight his way back S. to Amiens, carrying with him, if possible, the Fr. and Belgian Armies from the N. Gort was obliged to point out that this course was impracticable, as he would have simultaneously to fight a rearguard action against a superior enemy, and to break through a superior enemy. He knew that the Fr. and Belgian Armies could not have conformed even if they would, and the B.E.F. no longer had the supplies for protracted operations. On 23 May Calais was isolated. Its defence for over 4 days by the Royal Tank Regiment and the 30th Brigade was a most gallant action, which held off effectively this claw of the Ger. attack from Dunkirk. (See also CALAIS.) Plans for an Allied counter-attack towards the S. were prepared to begin on 26 May. But already on the 24th the enemy had driven in the Belgian line on the Lys, and the projected counter-attack never took place. On 26 May plans were agreed for withdrawal by stages to the Dunkirk perimeter. During that day it was evident that the Belgian Army could not retire on the Yser, and that a gap would open between it and the B.E.F. Thereafter the plans for the final withdrawal from Dunkirk were put in hand. See WESTERN FRONT in SECOND WORLD WAR. See E. Keble Chatterton, *The Epic of Dunkirk*, 1940; Lord Gort's Dispatches, *London Gazette*, 10 Oct. 1941; and F. Ellis, *The War in France and Flanders*, 1939-40, 1954.

Flandrin, Jean Hippolyte (1809-64), Fr. historical and portrait painter, b. Lyons. His fame rests chiefly on his monumental decorative work in the church of St Germain-des-Prés, notably his frescoes, 'Christ entering Jerusalem' and 'Christ going up to Calvary', 1842-4, and in the choir his figures of many saints and virtues, 1846-8. The cathedral of Nantes possesses his 'St Clair healing the Blind,' and his pictures may also be seen in the churches of St Paul at Nîmes, St Vincent de Paul at Paris, and St Martin d'Ainay at Lyons. He was much influenced by Ingres (q.v.).

Flange, projecting rim or edge, used in engineering, machinery, building, etc., either to strengthen an object, or to afford means of fixing it to another object, or to serve as a means of guidance. The variety of F.s is too great to be fully detailed here. A girder consists of a vertical web connecting horizontal parts called the F.s, which are necessary to its strength, and iron joists are a similar combination of web and F.s. The use of a F. for jointing purposes is seen in cast-iron pipes, the ends of which are joined by bolts passing through the F., while iron plates are also made with F.s at all 4 sides to enable them to be bolted together. Such plates

are used in the construction of the tubular tunnels for underground railways, the F.s serving as ribs and strengthening the structure. The most frequent use of the F. for guiding purposes is to be seen in the tyres of tramcar or railway carriage wheels, where the F.s prevent the vehicle from leaving the rail. A back F. is the plate placed over the end of a cylinder in order partly to close the aperture.

Fiannan Islands, or Seven Hunters, uninhabited is, group of Scotland, in the par. of Uig, Ross-shire, situated 20 m. NW. of Gallon Head, and consisting of 7 is. and 20 rocks, the highest point reaching 282 ft. The group contains some interesting Caledonian ruins, which are estimated as dating from the early 8th cent. Cragmen frequent the is. in June to obtain the eggs of the elder ducks, gannets, and other sea fowl, which breed there.

Flannel, soft woollen textile, made usually from loosely spun yarn. The origin of the word is probably Welsh, as F. made from the short staple wool of the mt sheep was a well-known production in Wales early in the 18th cent. A material known as baize, which is a sort of coarse F., was introduced into England by the Fr. refugees about 1578. With the changing fashions of the 20th cent. its use as an apparel cloth suffered a sharp decline and many garments and household textiles formerly made of F. are now made of flannelette, a lighter material made of cotton. In Rochdale, which is the historic seat of the industry, the manufacturers favoured wool from the South-down or Norfolk breeds. In the Rep. of Ireland the wool from the Cottagh breed is used. F. is now largely made from Australia, New Zealand, and S. Amer. wools.

Flash Point, temp. at which an oil will give off a vapour which can be ignited. This temp. varies with the pressure on the surface of the oil, and is higher when the oil is heated in an open apparatus than when a closed one is used. To obtain an exact ratio a standard apparatus must be used. In England the one used is Abel's closed oil tester. It consists of a closed receptacle surrounded by a water jacket. The temp. is taken by means of a thermometer in the water. The oil receptacle is fitted with a sliding lid. From time to time this is slipped back and a light applied to the opening. The lowest temp. at which a flame appears is taken as the F. P. of the particular oil that is being tested. In most countries there are special regulations with regard to the storage of oils with low F. P.s. In England the minimum legal F. P. (determined in a closed apparatus) is 73° F.

Flask Fungi, see PYRENOZYCTES.

Flat (O.E. *flet*, floor; Amer. 'apartment'), term applied to a section of a building which is used as a separate residence. F.-living is a prominent feature of mid-20th-cent. life because of the cost of the upkeep of houses, the scarcity of domestic labour, and the shortage of building space in modern cities.

In Europe, in addition to large-scale building of modern blocks of F.s, it is quite usual for existing houses to be converted into F.s and flatlets. In Amer. cities, especially New York, where sites are highly valuable, the attraction of apartment and tenement blocks has assumed far greater proportions than in Europe.

Fiat (♭), character in musical notation which indicates that a note is to be sung or played a semitone lower than its natural pitch. The F. sign always occurs before the note to be flattened in the case of an accidental, for example, where the F. comes in temporarily in the course of a piece of music outside the prescribed key, and the effect does not extend farther than the bar in which the F. is put. But the F.s occurring regularly in the key chosen by the composer are placed in the key-signature at the beginning of each stave, and apply throughout unless contradicted by another accidental. A double F. (♭♭) is a sign placed before a natural note to show that the pitch is to be lowered by a whole tone.

Fiat-coated Retriever, see RETRIEVER.

Fiat-fish. Any species of the teleost order Heterosomata, fishes with long dorsal and anal fins, strongly compressed bodies, and with both eyes on one side of the head. They live at the bottom of the sea, resting on the blind side of the body. The family Pleuronectidae embraces the dextral F. (halibut, etc.), with eyes on the right side; Bothidae, the sinistral F. (turbot, etc.); Soleidae (the soles), eyes right; Cynoglossidae (tongue soles, tropical species), eyes left. Young F., met with in the open sea, are transparent and perfectly symmetrical, having 1 eye on each side of the head, and it is evident from individual metamorphosis that the order was originally normal in shape, though there is some difference of opinion as to the process of their evolution. The F. is exclusively carnivorous, and inhabits all seas except those of polar regions or off rocky coasts. Many species, such as flounders, ascend rivers, and some have become inured to a fresh-water existence. The pigment-bearing elements in the coloration of the dark side of the skin are known as chromatophores. When lying on the sandy bottom of the sea, which it chooses in preference to a muddy bed, the F. is hardly to be distinguished from its surroundings, as the bright spots on the skin harmonise exactly with the sand and pebbles. The least specialised or most primitive species is *Pectodius crumeni*, which ranges from the Red Sea through the Indian Ocean to China, and is also found on the W. coast of Africa; it has the dorsal fin commencing at the nape of the neck, whereas in all others it commences above or in front of the eyes. *Hippoglossus hippoglossus*, the halibut, has both eyes on the right side. The genus typified by *Scophthalmus maximus*, the turbot, contains also *S. isolepis*, the brill. *Pleuronectes platessa*, the plaice, and *P. flesus*, the flounder, are characterised by the narrow mouth aperture. Another

group includes *Solen solea*, the common sole; *S. lascaris*, the sole; *S. variegata*, the banded sole; *S. minuta*, the dwarf sole, and other allied species. See FISHERIES.

Flat-foot, acquired deformity of the foot, in which both arches of the foot are impaired, more especially the longitudinal arch. It is caused generally by long periods of standing, and is therefore commonly seen in policemen, domestic servants, hospital nurses, etc. The tendency to F. is increased by any constitutional weakness, by lack of proper food, and by general debility. It is especially liable to occur after Potts's fracture of the ankle. In its earlier stages the condition is accompanied by pain along the under and inner part of the foot.

Treatment.—It is important that the condition should be treated early. Excellent results may then be obtained by rest, massage, and suitable exercises. The most useful exercises are standing and walking on tiptoe, rising on tiptoe and falling back on the heels; balancing on the outer edge of the feet; and walking on the outer edge of the feet. Many patent supports are made for this condition, and are very generally used. They are not to be recommended, as they tend to stretch further the tendons and ligaments of the sole of the foot which are already lax, and so, too, increase the F. High heels should be especially avoided. In the later stages of F., attempts have been made to improve the condition by setting the foot in the correct position in plaster of Paris splints. Some surgeons operate for the condition. If, however, the condition has been allowed to go far, it becomes extremely intractable, and the results of operation are often disappointing.

Flat-racing, see HORSE-RACING.

Flat Worms, see PLATYHELMINTHES.

Flatbush, formerly a township of Long Is., near Prospect Park, Brooklyn. It is now part of the bor. of Brooklyn.

Flatsejarbok, or the *Book of Flatsej*, collection of Icelandic legends and true stories, which was compiled in the 14th cent., and which deals chiefly with the 10th and 11th cents. AD. One story tells how certain Norsemen reached America some 4 centuries before Columbus. The MS. is now preserved in Copenhagen. A photo-lithographic facsimile ed. appeared in 1930 as vol. 1 of the *Corpus codicum Islandicorum medii ævi* series.

Flatford, beauty spot in the par. of East Bergholt, on the R. Stour, Suffolk, England. F. Mill, the property of the National Trust, and Dedham Mill (on the Essex side of the Stour) figure in famous paintings by Constable.

Flatheads, name given to certain Amer. Indian tribes, especially the Salish (q.v.), Choctaw (q.v.), Chinook (q.v.), and Waxhaw. The name distinguished them from certain neighbouring tribes who compressed infants' skulls to produce a peaked shape; the F. left their heads in the natural condition, flat on top.

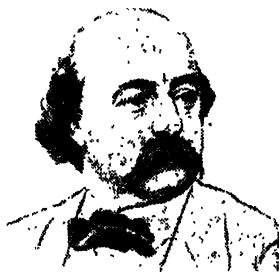
Flatman, Thomas (1637-88), poet and miniature painter, educ. at Winchester

and New College, Oxford, being a fellow of the latter in 1676. Two miniature self-portraits survive. Granger says: 'One of his heads is worth a ream of his Pindarics.' Saintsbury, on the other hand, says his 'unlucky name by no means expresses his poetic quality.'

Flattery, Cape, headland of Washington state, U.S.A., washed on the NE. by the strait of Juan de Fuca, and on the SW. by the Pacific. A lighthouse and meteorological station are here on Tatoosh Is.

Flatulence, condition characterised by the presence of gas (*flatus*) in the stomach or intestines. Digestion is accompanied by bacterial action which, to a certain extent, aids the activity of the digestive ferments. Bacterial fermentation is accompanied by evolution of gaseous products. A common cause of F. in infants and adults is air swallowing.

Flaubert, Gustave (1821-80), Fr. novelist, b. Rouen. He was the son of a



GUSTAVE FLAUBERT

surgeon, and did not leave his native place till 1840, when he went up to Paris to study law. His mother having been left alone through the death of his father and sister, he abandoned the idea of a legal profession, and made a home for her at Croisset, on the Seine, not far from Rouen, where he lived till his death. At this time he became an intimate friend of M. Maxime du Camp, with whom he travelled in Brittany in 1847, and Greece and Asia Minor from 1849 to 1851. From 1846 to 1854 he had an *affaire de cœur* with Mlle Louise Colet, apparently the only one of his life, although the unrequited love he conceived for Mme Elisa Schlesinger at the age of 15 had more influence on his character.

He began to write about 1846, and started with poetry, which he soon abandoned for prose. On his return from Greece he set to work on his great novel, *Madame Bovary*, which took many years to prepare, and finally appeared in serial form in the *Revue de Paris* (1857). It is the story of a girl of high aspirations married to a well-meaning but stupid

doctor. Her various lapses into vice and her ultimate suicide are related with startling vividness. The pub. caused a great deal of scandal, and the author and publisher were prosecuted on a charge of violating morals, but were acquitted. In the following year F. paid a visit to Carthage and began a serious archaeological and historical study of its surroundings, which he made use of in his 2nd work, *Salammbô*, finished in 1862, a romance of the struggle between Rome and Carthage.

In 1866 he was decorated with the Legion of Honour. Three years later he pub. a realistic novel of contemporary manners of the type of *Madame Bovary*, called *L'Education sentimentale*. It was followed in 1874 by *La Tentation de Saint Antoine*, a fantastic romance, worked up from fragments which he had written as early as 1857. He was now a distinguished member of a small literary set, which included Turgenev, Zola, Daudet, and the Goncourts. He was, moreover, a personal friend of George Sand, his correspondence with whom was pub. posthumously. By temperament he was shy and morose, and wrote with great intensity, labouring over every word and never satisfied with what he had written. In 1877 he pub. *Trois Contes*, including *Un Cœur simple*, *La Légende de Saint Julien-l'Hospitalier*, and *Hérodias*. His last work, *Bouvard et Pécuchet*, was unfinished, and was pub. posthumously in 1881. He d. of apoplexy, and was buried in the family vault at Rouen.

F.'s style is a model of purity and strength. His work is tinged with satiric melancholy. He loathed everything mediocre, and his hatred for the *bourgeois* amounted almost to monomania. He wrote with an extraordinary knowledge and insight of the manners of his time, and as a literary artist must be placed between the realistic and romantic schools, belonging to neither and yet having much in common with both. His undoubted preference was for romanticism, and it was rather in spite of himself that he achieved so great a triumph with his realistic novel, *Madame Bovary*, and so much so, that he is regarded as the true inspiration of all modern realist fiction.

His *Œuvres complètes* were pub. in 8 vols. in 1885; his *Correspondance* in 4 vols., 1887-93. Of his works not already mentioned should be noticed 2 plays, *Le Candidat*, 1874, and *Le Château des cœurs*, 1877; and *Par les champs et par les grèves*, 1885. See Maxime du Camp, *Souvenirs littéraires*, 1882-3; E. Zola, *Les Romanciers naturalistes*, 1881; lives by E. Faguet (*Grands Écrivains français*), 1899; L. Bertrand, 1912; and A. Thibaudet, 1935; also R. Dumesnil, *Gustave Flaubert, l'homme et l'œuvre* (with bibliography), 1932; H. Guillemin, *Flaubert* (with *le vic et devant Dieu*), 1939; F. Steegmüller, *Flaubert and Madame Bovary*, 1947.

Flavigny-sur-Ozerain, Fr. vil. in the dept of Côte d'Or, noted for its culture of linseed. Pop. 820.

Flaviobriga, see CASTRO URDIALES.

Flavionavia, see AVILÉS.

Flavius, Julius, see CONSTANTIIUS II.

Flavius Porphyrogenitus, see CONSTANTINE VII.

Flavius Valerius, see CONSTANTIIUS I.

Flavones, Flavonols, 2 classes of colouring substances of plants also known as anthoxanthins, closely related chemically to the anthocyanins, and, like them, sap soluble, and usually occurring as glycosides, but differing in colour, which ranges from ivory to deep yellow.

Flawil, small tn, 8 m. W. of St Gallen, with which it is connected by rail, between the lakes Constance and Zürich in the NE. of Switzerland. Pop. 6000.

Flax (*Linum usitatissimum*), dicotyledonous plant of the order Linaceae. It is an ann., growing from 20 to 40 in. in height. The stems are generally solitary and terminate in a loose corymb of blue or white flowers. The stem of the plant yields F. fibre used for the manuf. of linen, while the seed of the plant (linseed) is of value commercially in the paint industry (linseed oil), and for the manuf. of cattle feeding stuffs. Varieties have been bred to give either a high yield of fibre with little seed (fibre varieties) or a high yield of seed at the expense of fibre (linseed varieties). The plant thrives in most types of soil in temperate climates, rich alluvial soils being especially well suited to its culture. As a crop, F. is not able to compete well with weeds and, therefore, some form of weed control is generally essential. F. fibre was used in the earliest periods of civilisation; it is mentioned in the book of Exodus, and Egypt was famous for her linen.

The preparation of F. fibre entails 5 stages, viz. (i) *Pulling*—The crop is generally pulled up by the roots instead of being cut; (ii) *Deseeding or Rippling*—This involves removing the seed bolls from the stalks; (iii) *Retting*—This is done either by steeping in water (a) in dams or ponds in the ground (dam-retting), or (b) in concrete tanks at a higher temp. for a shorter period of time (tank-retting), or by leaving the F. straw lying on the ground exposed to dew and rain (dew-retting); (iv) *Drying*—The retted straw may be dried in 'gaits' out in the field or by artificial means in hot-air driers; (v) *Scutching*—This is the mechanical separation of the fibre from the woody part of the stem. It may be done mechanically in turbines or by hand.

Retting (iii) may be omitted altogether and the deseeded straw scutched 'green.' The green F. so produced is chemically treated at a later stage to compensate for the lack of retting. Processes have also been devised for chemically treating the straw prior to scutching instead of biologically retting it.

The F. fibre production industry of Great Britain has steadily declined since the middle of the last century. F. is still grown in Ireland, Russia, Belgium, and Holland are large F. fibre-producing countries. In the U.S.A. F. is largely grown for linseed.

Flax, New Zealand (*Phormium tenax*), also called **Flax-lily**, **Flaxbush**, monocotyledonous plant belonging to the Liliaceae order. It grows wild in N. Z., but is half hardy in Great Britain, where it is generally grown in cool greenhouses. Its leaves are from 2 to 6 ft long, and 2 or 3 in. broad. Their fibres are very strong and fine, and in N. Z. are used to make clothes, dresses, mats, etc. In England the N. Z. F. is used chiefly for ropes and sailcloth. It is obtained by cutting the leaves from a plant and macerating them, after which the fibres are easily extracted. The New Zealanders obtained more perfect F. by a laborious process of manual separation without maceration. Intensive research work has been carried out in N. Z. at Massey College on the breeding and selection of improved strains of *Phormium* with a view to raising the general standards of strength and productivity, and encouraging results have been obtained by the college.

Flaxman, John (1755-1826), sculptor, b. York. He was the son of John F., a

art, and while there, executed his famous designs for Homer (pub. 1793), Aeschylus, 1795, and Dante's *Divina Commedia*, 1797, as well as a marble group of 'The Fury of Athamas,' and a 'Cephalus and Aurora,' from the stories in Ovid's *Metamorphoses*.

He was elected R.A. in 1800; appointed prof. of sculpture to the Royal Academy in 1810. He tried, with some success, to introduce a purified classicism into sculpture and may be compared with Canova (q.v.) and Thorwaldsen (q.v.). The most notable of his later works are monuments of Nelson, Howe, and Sir Joshua Reynolds in St Paul's, Lord Mansfield and Capt. Montague in Westminster Abbey, and 'St Michael' at Petworth. The F. gallery in Univ. College, London, was founded by his wife's sister. His *Lectures* were ed., with a 'Brief Memoir' in 1829. See A. Cunningham, *Lives of the Most Eminent British Painters, Sculptors, and Architects* (vol. iii), 1839; S. Colvin, *The Drawings of Flaxman*, 1876; W. G. Constable, *Flaxman*, 1927.

Fleabane, popular name for plants of the genera *Pulicaria* and *Erigeron* (q.v.), both of the Compositae; from the former a volatile oil is prepared, which keeps away insects, and the scent of the *Erigeron acris* serves the same purpose.

Fleas, parasites of the *Pulex* genus. There are about 500 varieties known, many of which are specific to some particular bird or mammal. The word is commonly used to refer to the variety that chiefly infests man, the *Pulex irritans*.

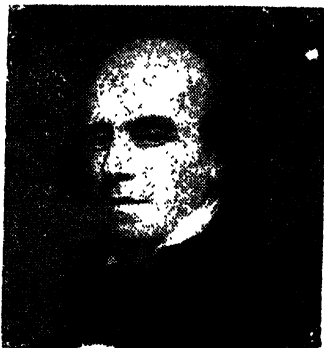
The flea is a wingless insect, with a laterally compressed body strongly cased in chitin to withstand pressure, small head, and 6 long powerful legs. It lives on the blood of warm-blooded animals, though it can evidently live for long periods without such food. The piercing organ is the mandible, and not the maxilla, while the upper lip forms the sucking tube. The flea is justly famous for its jumping powers, which are equal to those of the locust, that is, it can jump 200 times its own length.

The eggs are not very numerous as a rule. They hatch in from 6 to 12 days, when wormlike bristly larvae emerge. These live for about a fortnight feeding on decaying organic matter before forming cocoons. Thus *Pulex irritans* takes about a month to reach maturity. The Indian rat-flea, *Xenopsylla cheopis*, transmits the plague (q.v.).

The chigoe or jigger of South America and West Indies is another famous member of the family. See CHIGOE.

Flèche, La, tn in the dept of Sarthe, France, on the R. Leir. A school founded by Henry IV in 1607 has become a famous military academy for officers' sons. The tn has an agric. market, a timber trade, and manufs. paper and leather goods. Pop. 11,300.

Flèche (Fr. *flèche*, arrow), in architecture, a small and slender wooden spire covered with lead. There is a fine example on the cathedral of Notre Dame, Paris.



JOHN FLAXMAN

Engraving after the painting by John Jackson

moulder of plaster figures and casts in Covent Garden, London. He was a sickly, slightly deformed boy, and spent his childhood mostly indoors, drawing and playing with moulds. He exhibited models at the Free Society of Artists in 1767 and 1769, and won the silver medal of the Royal Academy in 1770. During 1775-87 he earned a livelihood by his beautiful designs for the china-ware of Messrs. Wedgwood. In 1782 he married and settled in a studio in Wardour Street, where he executed monumental memorial sculpture. His work of this class includes monuments of Chatterton in St Mary Redcliffe, Bristol; of Collins, and of the Rev. T. and Mrs Morley in Gloucester Cathedral; and from 1787 to 1794 he lived in Italy, studying and perfecting his

Flecker, James Elroy (1884-1915), poet and playwright, b. Lewisham, London. He was the elder son of W. Herman F., headmaster of Dean Close School, Cheltenham, where he was educ. before going to Trinity College, Oxford. James was his substitution for Herman, his baptismal first name. Prepared for consular service by 2 years at Cambridge, where he studied oriental languages, he served in Constantinople in 1910 and 1911, and transferred to Beirut, where he was vice-consul till 1913. He d. of consumption at Davos Platz. His works include: *The Bridge of Fire*, 1907, *Forty-two Poems*, 1911, *The Golden Journey to Samarkand*, 1913, *The Old Ships*, a collection of 17 poems pub. posthumously, 1915, a novel, *The King of Alcazhar*, 1914, 2 plays, *Hassan* and *Don Juan*, both pub. posthumously. F. follows the objective methods of the contemporary Fr. poets of the Parnassian school, eschewing the personal and emotional. Except in *Hassan* he rarely got beyond the stage of experimentation in verse. *Hassan* is notable more for its lyrics than for any dramatic qualities. It was produced at the Haymarket in 1923. See J. C. Squire's introduction to *The Collected Poems of James Elroy Flecker*, 1916.

Flecknoe, Richard (d. c. 1678), poet and playwright, b. Oxford. He is said to have been a Jesuit priest. He travelled between 1640 and 1650 in Europe, Asia, Africa, and Brazil. Andrew Marvell visited him in Rome and wrote a satirical account of him which gave Dryden the idea of *MacFlecknoe*, by which F. is chiefly remembered, though Shadwell (q.v.) is the real object of this satire. F. pub. a vol. of poems entitled *Miscellanea*, 1653, sev. plays, and *A Short Treatise of the English Stage*, attacking the prevailing indecency. See study by A. Lohr, 1900.

Fleet (O.E. *flentan*, to float; cf. Ger. *fließen*), word denoting a collection of ships, and particularly a collection of warships belonging to the navy of one nation, and under the supreme command of a single officer. The word is also applied to a number of vessels for fishing or other commercial purposes.

Fleet Air Arm consists of those aircraft, and the men who fly and tend them, that are embarked in H.M. ships; it is a part of the R.N., and not of the R.A.F. In the Second World War it did not fly from H.M. ships alone, if the needs of the moment required otherwise. Naval squadrons at home operated as units of one or other command of the R.A.F.—coastal (q.v.) or fighter (q.v.)—for operations in the Channel or in other seas. In the battle of Britain (q.v.) more than 40 naval pilots, few of whom survived, joined the fighter command and fought alongside their brethren of the R.A.F. Among the many operations in which the F. A. A. greatly distinguished themselves were those at Taranto, when many It. warships were sunk or damaged (see *WORLD WAR, SECOND, Naval Operations*), the battle of Matapan (q.v.), the sinking of the *Bismarck* (see 'BISMARCK, THE'),

and the Malta convoys. Some 6 old Swordfish planes of the F. A. A. made a most heroic if abortive attempt to stop the escaping Ger. warships *Scharnhorst*, *Gneisenau*, and *Prinz Eugen* in the Eng. Channel on 12 Feb. 1942. Lt.-Cdr. Esmonde, who led these aircraft on that occasion, receiving a posthumous V.C. Aircraft carriers are the moving airfields of the F. A. A. See *The Fleet Air Arm* (pub. by the Admiralty, H.M.S.O.), 1943, and J. Moore, *The Fleet Air Arm*, 1943, and *Escort Carrier*, 1944.

Fleet Prison, famous London jail, was in existence 1197, possibly earlier, and was situated on an is. formed by ditches on the E. bank of the riv. from which it took its name. It was used for a variety of prisoners, including those sentenced under the Star Chamber and Court of Chancery, and for Catholic and Protestant martyrs. After abolition of the Star Chamber (1641) it came to be used largely for debtors and bankrupts. It became notorious for the clandestine marriages in the chapel from c. 1613 until 1753, when they were declared null and void by act of parliament, though such marriages were celebrated within the liberties of the F. until 1774. The prison was rebuilt on each occasion after destruction by the Wat Tyler rebels, the Great Fire, and the Gordon rioters. It was closed in 1842 and demolished in 1844, when the site was used as the city stone-yard until purchased by the London, Chatham, and Dover Railway in 1864. See J. Ashton, *The Fleet, its River, Prison and Marriages*, 1888.

Fleet Street, London, named after the R. Fleet (O.E. *flæt*, 'stream,' 'creek'), runs from Ludgate Circus to where it joins the Strand (q.v.) at the Temple Bar Memorial. The earliest extant reference to it is c. 1188. In early times it was so called up to the palace of the Savoy in the Strand. Up to the mid-15th cent. it was, apart from Thames Street, the only paved street in the city and its immediate vicinity. It became celebrated for its taverns and signboards, and was the route of coronation processions. In modern times it has become the centre of London's newspaper industry. See W. G. Hell, *Fleet Street in Seven Centuries*, 1912.

Fleetwood, Charles (d. 1692), commonwealth soldier, 3rd son of Sir Miles F. of Aldwinkle, Northants. His eldest brother was a royalist; the second, George, was a gen. in the Swedish Army; and Charles, studying law in Gray's Inn when Civil war began, joined the parl. army as a trooper. He was colonel of horse at Naseby, governor of the Isle of Wight, 1649, and fought with Cromwell at Dunbar, 1650. He became a member of the council of state and lieutenant-general of the horse in 1651. He led cavalry at Worcester. F. married (2nd of 3 wives) Bridget, daughter of Cromwell and widow of Ireton, 1652. In Ireland as commander-in-chief till 1655—for last year lord-deputy. He was one of the major-generals of 1655, and one of 'Oliver's lords.' He was popular with the sectaries. He took a leading part in the

overthrow of Oliver's successor, Richard, in 1659, and was made lieutenant-general and commander-in-chief by the recalled Rump parliament. The Rump deprived him of all his commands following his support of Lambert's (q.v.) *coup d'état* in Oct. 1659. He was included in the indemnity at the Restoration. F. was buried in Bunhill Fields.

Fleetwood, bor. and port at the mouth of the R. Wyre, Lancs, England, 9 m. N.E. of Blackpool. It has steamship services to the Isle of Man. The chief industries are steam-trawler fishing and holiday catering. Pop. 27,525 (1954).

Flegel, Eduard Robert (1855-86), Ger. traveller in West Africa, b. of Ger. parentage at Vilna in Russia. After a commercial education he devoted his life to acquiring for Germany the major share of the trade of the Niger. He ascended this riv. first in 1879 in the London Missionary Society's steamer, and a year later in his second ascent reached Sokoto. In 1883 he discovered the sources of the Benue to the S. of Adamawa. He wrote *Loose Blätter aus dem Tagebuche meiner Hausaufreunde*, 1885, and *Vom Niger-Benue* (ed. by K. Flegel), 1890.

Fleischer, Heinrich Leberecht (1801-88), the greatest Ger. Arabist of the 19th cent. Pupil of S. de Sacy. 1835 onwards, prof. at the Univ. of Leipzig. Ed. sev. Arabian texts including Abū'l-Fidā's *Pre-Islamic History*, 1831, Az-Zamakhshari's *Anthologies*, 1835, and Al-Baidāwī's *Commentary on the Koran*, 1847-8. Also wrote numerous articles, collected in *Kleinere Schriften* (3 vols.), 1885-8.

Fleming, Sir Alexander (1881-1955), bacteriologist, b. Lochfield, Darvel, Scotland. Educ. at Kilmarnock Academy and St Mary's Hospital Medical School, London. M.B., B.S. (London), and the univ. gold medal, 1908; F.R.S., 1943; F.R.C.P., 1944. Prof. of bacteriology at St Mary's Hospital, 1924-48. He is best known for his discovery (in 1928) of the anti-bacterial substance penicillin (q.v.), extracted by him from a green mould, *Penicillium*, which contaminated a culture of bacteria on which he was working. His early extracts proved unstable, and it was not until the Second World War that a stable product was prepared on a large scale, and was the means of saving countless lives. For his part in this work F. was knighted in 1944, and in 1945 shared the Nobel prize with Sir H. W. Florey and K. B. Chain. His earlier discovery of lysozyme, 1922, an antiseptic present in tears, was also important. He pub. many papers on bacteriological subjects, and gained numerous distinctions beside those here detailed. Biography by L. D. Ludovic, 1952.

Fleming, David Hay (1849-1931), Scottish historian, b. St Andrews, and educ. at the univ. there. He retired from business to devote himself to Scottish hist. Puba. include *Scotland after the Union of the Crowns*, 1890, *Mary Queen of Scots*, 1897, *The Story of the Scottish Covenants in Outline*, 1904, and *The Reformation in Scotland*, 1910.

Fleming, Sir John Ambrose (1849-1945), electrical engineer, b. Lancaster. He entered St John's College, Cambridge, in 1877, and after a brilliant career was appointed univ. demonstrator in applied mechanics; first prof. of mathematics and physics at Univ. College, Nottingham; electrical engineer to the Edison Electric Lighting Company, 1881, in which capacity he superintended the introduction of incandescent electric lighting in England. In 1885 he became prof. of electrical engineering in Univ. College, London, and obtained the erection of its engineering and electrical laboratories. He made the first thermionic valve in 1904. Chief pubs.: *Short Lectures to Electrical Artisans*, 2nd ed., 1885, *Magnets and Electric Currents*, 1897, *Wireless Telegraphy*, 1905, *Radio-telegraphy and Radio-telephony*, 1908, *Propagation of Electric Currents in Telephone and Telegraph Conductors*, 1911, *The Wonders of Wireless Telegraphy*, 1913, *The Thermionic Valve in Radio-telegraphy*, 1919, *Fifty Years of Electricity*, 1921, *Electrons, Electric Waves, and Wireless Telephony*, 1923, and *The Interaction of Scientific Research and Electrical Engineering*, 1927. He was knighted in 1929.

Fleming, Peter (1907-), travel writer, b. London. Educ. at Eton and Oxford, he took up journalism and travelled in Mexico, Brazil, China, Japan, and other countries, often as a special correspondent of *The Times*. His books include *Brazilian Adventure*, 1933, *One's Company*, 1934, *News from Tarrary*, 1936, *The Flying Visit*, 1940, *A Story to Tell*, 1942, *The Sixth Column*, 1961, *A Forgotten Journey*, 1952, *Invasion 1940*, 1956, *From Russia with Love*, 1957.

Fleming, Sir Sandford (1827-1915), Canadian engineer, b. Kirkcaldy, Scotland. He became chief engineer for the dominion gov. (1867-80), when he superintended the construction of the Intercolonial railway. Author of *The Intercolonial: a History*, 1876, *England and Canada*, 1884, and *The New Time Reckoning*, 1889. See L. J. Burpee, *Sandford Fleming, Empire-Builder*, 1915.

Flemings, see FLANDERS.

Flemings in England. Flem. settlers probably first came to England in the reign of Henry I. A number were settled in Pembrokeshire, where they maintained their position in spite of the hostility of the native Welsh pop. The colony retained its separate and distinct character for sev. centuries. During the reign of Stephen, Flem. weavers estab. themselves in the E. coas. and made Norwich famous as the centre of the cloth industry. The close commercial relations between England and Flanders estab. by the *Magnus Intercursus*, 1496, encouraged emigration. During the Reformation many Flem. Protestants sought refuge in this country.

Flemish Art. During the 14th cent. painters in Flanders still worked in the Fr. miniature style. This was transformed and a true and splendid beginning given to F. A. by the Van Eycks, Hubert (b. 1426) and Jan (d. 1441) (qq.v.).

Little is known of Hubert but both may have collaborated on the famous Ghent altarpiece, 'The Adoration of the Lamb.' A Flem. school arose soon after in the 15th cent., comprising many notable masters. They include Robert Campin (d. 1444), Petrus Christus (c. 1410-c. 1472), Dirck Bouts (c. 1415-1475), and Rogier van der Weyden (c. 1399-1464). Van der Weyden (q.v.) is the leading figure in this first period—a successful master with an active workshop in Brussels. Hans Memling (or Memlinc) (q.v.) (c. 1430-94), a native of the Rhineland who settled in Bruges, is famous for his panels of religious subjects. Rogier van der Weyden, too, exerted an important influence on Memling. Memling's art is notable on account of his regard for unity, composition, and finish, and he was celebrated as a portrait painter. Most of his portraits are inspired by a religious emotion; thus he portrayed the donors of his altar-pieces praying under the protection of their patron saints. It is generally believed that Memling painted in oils. In the old chapter-house of the Hôpital Saint-Jean, Bruges, before the Second World War, were to be found sev. of his masterpieces: 'The Mystic Marriage,' 'The Adoration of the Wise Men,' 'The Shrine of Saint Ursula,' 'The Descent from the Cross,' and others. Of this period, too, are Gerard David (q.v.) (c. 1450-2) of the Bruges school, who was famous for altar-pieces, Quentin Matsys (q.v.) (1466-1530), who also painted religious subjects, and Hugo van der Goe (1440-82). There follows what has been called a 'first golden age.' The painters now include Jan Gossaert, called Mabuse (q.v.) (c. 1475-1536), who may be said to have changed the whole spirit of antecedent F. A. by Italianising it under the influence of the work of Leonardo and Michelangelo (q.v.). Mabuse is at his best in compositions with an elaborate architectural setting. His magnificent altar-piece, 'The Adoration of the Kings,' in the National Gallery, London, is essentially Flem. in outlook and is one of the glories of European art. Of equal importance is the fact that the remarkably minute finish of every part of the picture faithfully reflects the conscientious methods that inform the subtle work of the famous Flem. illuminators of MSS. Contemporary with Mabuse was the extraordinary painter (who must be classified with the Flem. school, though technically Dutch) Jerome Bosch (q.v.) (c. 1450-1516), whose fantasy and weird symbolism have captured the modern imagination in particular. Joachim Patenier (q.v.) (c. 1480-1524), the artist who first painted landscape for its own sake, i.e. not merely as a background or irrespective of its inherently exciting or dramatic qualities, is another highly original artist. His 'Repose in Egypt,' at Brussels, is a good example of his method. Henri de Bles (q.v.) (1480-c. 1550) is believed to have been a pupil of Patenier. His virgins and holy families, influenced by his long stay in Italy, show a departure from the original spirit of F.

A. Other 16th-cent. painters were Bernard van Orley (q.v.) (d. 1542), who was famous for tapestry designs; Michael Coxie (q.v.) (1494-1592), a pupil of van Orley, whose work shows the influence of Raphael; Lambert Lombard (q.v.) (1506-1560), who was also an engraver; Antonio Moro (q.v.) (c. 1525-81), painter to Queen Mary of England; and Pieter Brueghel (q.v.) (c. 1520-69), founder of the celebrated family of Flem. painters of that name, a great master in paintings of peasant life. Flem. painting reached its second golden age in the 17th cent.—the cent. of Rubens, van Dyck, and Teniers. Peter Paul Rubens (q.v.) (1577-1640), the most eminent representative of F. A. and one of the greatest painters of any school, excelled in every branch of his art, in portraiture, landscape, religious, mythological, and allegorical subjects. He does not aim at It. refinement or airy grace, but then neither does his work generally reflect the stiffness of Italianate imitators; rather is it Flem. in warmth and life throughout, and indeed it was Rubens who, reacting from the school of Mabuse, brought F. A. back to its true spirit and to nature. Some critics have charged him with historical improprieties or anachronisms; but he is too good a classical scholar not to be fully aware of what he is doing, and in this he followed the example of Titian, Paul Veronese, and others. For nearly a century the Flem. school of art may be said to have been but a reflection of the principles of Rubens and neither in name nor in fact did that school ever find a second Rubens; and his paintings (at least before the Second World War) were to be found in all the prim. galleries of Europe. Sir Anthony van Dyck (q.v.) (1599-1641) early in life worked with Rubens. At the outset of his career his power of conception was greatly superior to his refined taste as a portrait painter. One of the most brilliant figures in the hist. of art, he yet cannot be said to have formed a school. It was hardly possible for him to reach an equal degree of expression when choosing the same subjects as Rubens; but in applying the same principles of bold and comprehensive imagination to portrait painting he was no less successful; nor indeed are Titian, Raphael, Rembrandt, or Velazquez superior to him in this branch. The harmony of figure with background seems to have been with him a guiding principle, whether in light and shade or colour, while his physiognomical interpretation gives an enduring character to all his portraits because it is so closely related to picturesque necessity. Sometimes he may be thought to be deficient in solidity, but such a defect, if it is one, is outweighed by his sense of proportion, elegance of outline, and altogether admirable technique. David Teniers the Elder (q.v.) (1582-1649) and David Teniers the Younger (q.v.) (1610-94), though Flem. by birth and education, belong more closely to the Dutch school. The younger Teniers was a pupil of Rubens. In style he followed his father,

but with a much superior power of conception. He shows also the influence of Adrian Brouwer (q.v.) (1608-40) early in his career. Truth in physiognomy and beautiful effect of light and shade, frankness in expression, and freedom of attitude characterise his famous 'Jubilee Meeting of the Civic Guards,' which went to St Petersburg. Few artists worked with greater ease, and hundreds of his pictures are or were to be found in European museums or in private collections. While many of his interiors are masterpieces, they do not often equal his open-air



W. F. Mansell

VAN DYCK'S 'PORTRAIT OF A LADY'

scenes, which are alive with carefree joyousness and everlasting sunshine. Some of his tavern scenes are characteristic of this *genre*, though Brouwer was better acquainted with this *milieu* than was Teniers, while his cottage interiors are less realistic than those of Ostade and, as an etcher, Teniers compares unfavourably with both Ostade and Cornelius. Other 17th-cent. painters are Frans Snyder (q.v.) (1579-1657), painter of animals and of battle-pieces; Casper de Crayer (q.v.) (1582-1669), whose chief works are altarpieces; Jakob Jordaens (q.v.) (1593-1678) who, after Ruben's death, was the acknowledged leader of the Antwerp school; Gonzales Coques (or Cox) (q.v.) (1618-84), a pupil of Pieter Brueghel, who excelled in cabinet portraiture, taking van Dyck as his model; Pieter van der Faes (or Sir Peter Lely) (q.v.) (1671-80), whose *chef-d'oeuvre*, a series of portraits of women of the court of Charles II of England, is at Hampton Court; Lucas van Uden (1595-1672) and Jan Fyt (1609-61). A large

number of Flem. painters of small importance in the 17th cent. worked in the enormously productive workshop of Rubens. Among 18th-cent. painters are Cornelius Huysmans (1648-1727) and Jan van Bloemen (1662-1740).

Evidently one cannot speak of a contemporary Belgian school of art, whether Flem. or Walloon, or of any tendency to group artists of to-day under the inspiration of a common ideal. This might have been possible 20 years or more ago in the epoch of Expressionism. Considered the greatest Belgian painter of the last century is James Ensor (q.v.) (1860-1947), in whose imaginative pictures it has been said that the spirit of Bosch and Brueghel lives again. Of Belgian expressionist painters Fritz van der Berhe has sunk into oblivion and the reputation of Gustave de Smet has not survived a temporary popularity. Permeke and Tytgat are contemporary painters who cannot be easily classified. Tytgat is the most refined of to-day's Belgian painters. No coherent movement has succeeded Expressionism. Wolvens is perhaps the most richly gifted of all the modern Belgian painters, with his luxuriant colouring and heavily laid-on paint. The admirers of Paul Delvaux, who has been influenced by surrealism, do not hesitate to acclaim him the foremost Belgian painter, although in the effort to realise his dreams or obsessions he employs an academic technique.

The Last Flowering of the Middle Ages, by J. van der Elst, 1945, collates all the essential things that should be known in order to understand Flem. painting of the 15th cent. See also H. Florens-Gevaert, *Études sur l'art flamand: La Renaissance, septentrionale*, 1905; R. Oldenburg, *Die Flämischen Malerei im siebenzehnten Jahrhundert*, 1922; and L. van Puyvelde, *The Flemish Primitives*, 1948.

Flemish Bond, see BRICKWORK.

Flemish Language and Literature. Flem. belongs to the Teutonic group of the Indo-Germanic or Indo-European family, and is thus closely connected with German and with Eng. Together with the Dutch tongue it is generally called *Netherlandish*. There is very little documentary evidence of Old *Netherlandish* apart from an interesting trans. of the Psalms. The literature of Middle *Netherlandish*, which developed about the 11th or 12th cent., is particularly rich in romances and fables, among the former being *Karel ende Elegast* and *Floris en Blancefloer*, among the latter *Reinier*. Of the mystics of the 14th cent. Ruysbroek was the most important. New *Netherlandish*, or Dutch, dates from the early 15th cent. The love of literature and pride in the national tongue were promoted by the formation of *Kamers* or literary clubs. One of the oldest, the *Violler*, at Antwerp still exists. During the 17th and 18th cents., owing to historical reasons, literary activity was almost completely concentrated in the Dutch provs. But at the beginning of the 19th cent., after the separation of Belgium

from the Netherlands, there was a great revival of letters. The Flem. language had been largely superseded by Fr., and was regarded almost as a patois. The pioneer of the new movement was Willem (1793-1846), who aroused interest in Flem. literature by editing the old classics, and by founding in 1834 a literary organ for Flem. writers. The novelist Hendrik Conscience (1812-83) and the poet Guido Gezelle (1830-99) were the outstanding figures of this period. They prepared a new and most fertile literary activity. Among the poets of the modern school should be noted A. Rodenbach (1856-80), Pol de Mont (1857-1931), P. van Langendonck (1862-1920), K. van de Woestijne (1878-1929), P. van Ostayen (1896-1929), and M. Gijzen (b. 1899), and among the novelists are numbered C. Buyse (1859-1932), S. Streuvels (b. 1871), A. Vermeulen (1872-1945), M. Sabbe (1873-1938), H. Teirlinck (b. 1879), A. de Ridder (W. Elisehot) (b. 1882), F. Timmermans (1886-1947), M. Roelants (b. 1895), and G. Walschap (b. 1898).

See Fr. Cloeset, *Aspects et figures de la littérature flamande*, 1943; M. Gijzen, *De literatuur in Zuid-Nederland sedert 1830* (4th ed.), 1951. See also BELGIUM, Literature.

Flensburg, Ger. seaport in the Land of Schleswig-Holstein (q.v.), near the Dan. border, 45 m. NW. of Kiel (q.v.). It stands at the end of the F. fiord, an inlet of the Baltic Sea. The tn passed from Denmark to Prussia in 1864, and has many old churches and houses of interest. The prin. industries are shipbuilding, and the manuf. of paper, agric. machinery, and foodstuffs. The port has a large trade in rum, coal, timber, and cereals. In the closing days of the Second World War F. was the seat of the stop-gap gov. of Adm. Dönitz (q.v.). Here and at Kiel and Copenhagen the Germans had concentrated what remained of the Ger. Navy. The Dönitz gov. seems to have contemplated another redoubt in Norway; but it had only a precarious hold on F. and the adjacent area, and did not survive the unconditional surrender announced by Dönitz on 6 May 1945 (see GERMANY, History). Pop. 100,000.

Flers, Fr. tn in the dept of Orne. There is a 16th-cent. château. The tn was severely damaged in the Second World War. Linen and cotton are manufactured, and there are chemical and brick works. Pop. 12,300.

Flesh (O.E. *fleasc*), the softer tissues of the body, the muscles, adipose tissue, and generally those parts of an animal commonly used as food. The term is applied also to the body, and its capacity for receiving sense-impressions from phenomena in the world of matter as opposed to spirit, consequently F. stands for the baser parts of human nature. According to Ger. physiologists, F. is substance in the human body whose constitution approximates to that of muscle.

Flesh-fly, see HOUSE-FLY.

Fleishly school, name given by Robert Buchanan (q.v.) to the pre-Raphaelite

group of poets, more particularly to D. G. Rossetti (q.v.), in an article which he wrote attacking them. The article appeared in the *Contemporary Review* of Oct. 1871, under the pseudonym Robert Maitland, but the authorship soon became known and a violent controversy ensued. Rossetti wrote a temperate reply with the title 'The Stealthy School of Criticism.'

Fleta, early Lat. treatise on the common law of England, with the sub-title *Seu Commentarius juris Anglicani*. It is supposed to have been written during the reign of Edward I, about the year 1290. The author is unknown, but wrote it during his confinement in the Fleet prison; hence the name. The work is divided into 6 books, the author having adopted the plan of Bracton, and in many instances transcribed whole pages from him. F. was originally pub. by J. Selden from a MS. in the Cottonian Library in 1647, a 2nd ed. appearing in 1685. It is also printed in Honard's collection.

Fletcher, Andrew, of Saltoun (1655-1716), politician, b. Saltoun, East Lothian. He opposed the measures of the duke of York (subsequently James II) and was obliged to flee to Holland. In 1685 he accompanied Monmouth on his expedition to the W. of England. He returned to Scotland at the revolution of 1688 and his estates were restored to him. On the passing of the Act of Union, of which he disapproved, F. retired from public life.

Fletcher, Sir Banister Flight (1866-1954) architect, b. London, son of Prof. Banister F., architect. He entered his father's office in London, 1884, and became a partner in 1889. He continued to practise up to the time of his death, and carried out a good deal of varied building, notably the large Gillette factory near Isleworth, when he was 70 years of age. He was also a popular lecturer for many years, and he was president R.I.B.A. 1929-31; but his reputation rests almost entirely on the admirable *History of Architecture on the Comparative Method*, originally compiled and pub. in 1896 by the prof. and his son jointly. This has since been enlarged, revised, and repub. again and again, attaining a phenomenal success entirely on its merits.

Fletcher, Giles (c. 1588-1623), poet, b. London, son of Dr Giles F., a poet, and cousin of John F. the dramatist. He was educ. at Westminster School and Trinity College, Cambridge, where he became reader in Gk grammar (1615) and in Gk language (1618). He took holy orders and received the rectory of Alderton, Suffolk. His chief work is *Christ's Victorie and Triumph, in Heaven, in Earth, over and after Death*, 1610, a poem in the epic style, divided into 4 cantos. The poem owes much to Spenser and in turn influenced Milton. F. also contributed to *Sorrowes Joy* on the death of Elizabeth, and wrote *The Reward of the Faithful*, 1623. His poetical works were ed., along with those of his brother Phineas (q.v.) by F. S. Boas, 1908-9. See Fuller's *Worthies of England*, ed. 1811.

and H. E. Cory, *Spenser, the School of the Fletchers, and Milton*, 1912.

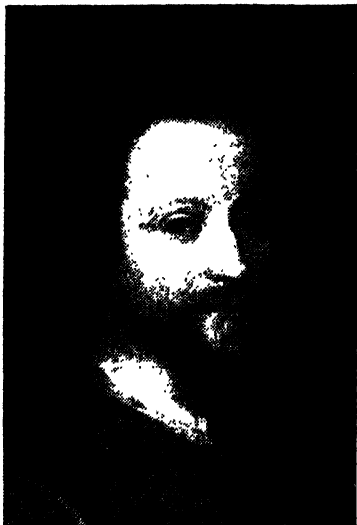
Fletcher, John (1579-1625), dramatist, b. Rye, Sussex, son of the vicar, who afterwards became bishop of London. A cousin of Giles and Phineas F. (qq.v.), he was educ. at Benet College, Cambridge, but very little is known of his life. From about 1606 to 1616 he carried on his famous literary partnership with Francis Beaumont (q.v.), and they collaborated in some dozen plays, of which the best are *The Scornful Lady*, 1610. *Philaster*, 1611, *The Maid's Tragedy*, 1611, *A King and*

Variorum Ed. of the plays of Beaumont and F., 1904-12 was under the general editorship of A. H. Bullen; A. Glover and A. R. Waller ed. a collation of all printed texts of them, 1905-12. See J. M. Mason, *Comments on the Plays of Beaumont and Fletcher*, 1798; O. L. Hatcher, *John Fletcher, a Study in Dramatic Method*, 1905; E. H. C. Oliphant, *The Plays of Beaumont and Fletcher*, 1927; J. E. Wilson, *The Influence of Beaumont and Fletcher on Restoration Drama*, 1928; U. M. Ellis-Fermor, *The Jacobean Drama*, 1936; and H. Maxwell, *Studies in Beaumont, Fletcher, and Massinger*, 1939.

Fletcher, John Gould (1886-), Amer. poet, b. Little Rock, Arkansas. Educ. at Phillips Academy, Andover, Massachusetts, and Harvard, he used his travelling experiences in his verse to good purpose. His sojourns in various parts of Europe and in the W. states of America, together with steamboat trips down the Mississippi, extended from 1908 to 1916, when he settled in London. His vols. of verse include *Fire and Wine*, 1913, *The Dominant City*, 1913, *Irradiations—Sand and Spray*, 1915, *Goblins and Pagodas*, 1916, *The Tree of Life*, 1918, *Japanese Prints*, 1918, *Breakers and Granite*, 1921, *Parables*, 1925, *Branches of Adam*, 1926, *The Black Rock*, 1928, *XXIV Elegies*, 1935, *The Epic of Arkansas*, 1936, *Selected Poems*, 1938, *South Star*, 1941, *The Burning Mountain*, 1946, and *Arkansas*, 1947. In 1933 he was awarded the Pulitzer prize for poetry. His critical works are *Paul Gauguin, His Life and Art*, 1921, *John Smith—also Pocahontas*, 1928, and *The Two Frontiers*, 1930. *Life is My Song*, 1937, is an autobiography.

Fletcher, Phineas (c. 1582-1650), poet, b. Cranbrook, Kent, elder son of Dr Giles F. He was educ. at Eton and King's College, Cambridge. With his brother Giles he contributed to *Sorrowes Joy*, 1603. His pastoral drama, *Sicelides, a Piscatory*, 1615, was written for performance before James I. He took holy orders, and ultimately became rector of Hilgay, Norfolk, where he remained for the rest of his life. His prin. work is *The Purple Island: or the Isle of Man*, 1633, written in 12 cantos of 7-line stanzas. It is an allegory of the human body, written in the manner of Spenser. There are many passages of great beauty, but much of the poem is marred by far-fetched conceits. F.'s other works include 2 prose treatises, *The Way to Blessedness* and *Joy in Tribulation*, both 1632, and a poem called *The Locusts, or Apollyonists*, 1627, attacking the Jesuits. His complete poetical works were ed. by A. B. Grosart in the Fuller Worthies Library, 1869, and along with those of his brother Giles by F. S. Boas, 1908-9. See H. E. Cory, *Spenser, the School of the Fletchers, and Milton*, 1912; and A. B. Langdale, *Phineas Fletcher*, 1937.

Fletton, par. of Hunts, England, close to Peterborough, and noted for its brickfields. Other industries include the manuf. of electrical appliances and machine and precision tools, the canning



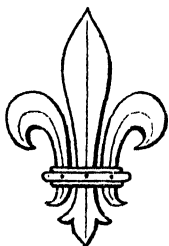
National Portrait Gallery
JOHN FLETCHER
Artist unknown

No King, 1611, *Bonduca*, 1614, and *Thierry and Theodoret*, 1616. They were credited with a great many more, as publishers found that their names on the title-page made a good selling line. Of the pair, F. is generally reckoned the more fluent and creative, and had a keener sense of 'theatre.' He was the sole author of some 16 plays, of which the most important, with their approximate dates, are *The Faithful Shepherdess*, 1609, *Valentinian*, 1618, *Monsieur Thomas*, 1619, *The Humorous Lieutenant*, 1619, *The Chances*, 1620, *The Pilgrim*, 1621, and *The Wild Goose Chase*, 1621. He probably collaborated with Shakespeare in *Henry VIII*, 1613, and possibly also in *The Two Noble Kinsmen*. F. also collaborated with Massinger in sev. plays, and probably with Rowley and Middleton in others. He d. of the plague. The

of fruit and vegetables, and processing of beet sugar. Pop. 8955.

Fleurance, Fr. tn in the dept of Gers, on the Gers. It has a trade in cereals, wine, and brandy. Pop. 3700.

Fleur-de-lis, heraldic device in armorial bearings of many countries, but it is especially associated with the royal house of France. The design is held by some to be based on the white lily, and shows 3 flowers joined together, the central one erect and the other two bending outward. Others, and with more probability, think it represents the white iris, the 'flower de luce' of Shakespeare.



FLEUR-DE-LIS

Fleurus, mrlkt tn in the prov. of Hainaut, Belgium, 7 m. N.E. of Charleroi. It is noted for 3 important battles. In 1622 the Germans, under the duke of Brunswick and Count Ernst von Mansfeld, gained a victory over the Spaniards. In 1690 the Fr. under the duke of Luxembourg, defeated the allied Dutch and Ger. forces, who were led by the prince of Waldeck. In 1794 the Fr., under Jourdan, defeated the Austrians under the duke of Coburg. Pop. 7200.

Fleury, André Hercule de (1653-1743), Fr. cardinal and statesman, b. Lodève. In 1679 he obtained the post of chaplain to Queen Maria Theresa, wife of Louis XIV, and in 1698 he became bishop of Fréjus. He was made a cardinal in 1726. F. was over 70 when he became chief minister to Louis XV. His financial administration was so efficient that the usual deficit was turned into a surplus of 15,000,000 livres, but he failed to deal with the fundamental causes of Fr. financial corruption. His foreign policy was pacific. His severe economies found him unprepared for the war of the Polish Succession (1733), though through it Louis XV gained Lorraine. In 1740 F. was again forced into a war with which he had no sympathy, that of the Austrian Succession. He d. soon after the evacuation of Prague.

Fleury, Claude (1640-1723), Fr. eccles. historian, b. and educ. in Paris. In 1672 he was appointed sub-preceptor to the dukes of Anjou, Burgundy, and Berry. He was then presented with the rich priory of Argenteuil. In 1691 he commenced his great work, the *Histoire*

ecclésiastique, pub. in 20 vols., continued by J. C. Fabre and Goulet.

Fleury, Flory, or **Flowerly**, in heraldry, indicates that the object is patterned all over with the fleur-de-lis (q.v.). The cross flory is a cross of which the extremities are tipped with a fleur-de-lis.

Flevoland, S.E. Polder in the IJsselmeer, Netherlands, in the course of construction. It is divided into E. F. (133,000 ac.) and S. F. (110,000 ac. when completed). See IJSSSELMEER.

Flexile Collodion, see COLLODION.

Flies. All insects which belong to the Diptera (q.v.) are commonly called F. This order comprises many families, and is widely distributed over the earth's surface, though certain species are limited to particular dists., as *Glossina morsitans*, the tsetse-fly, to equatorial Africa. *Musca domestica* is the specific name for the common house-fly; *Calliphora erythrocephala*, the blue-bottle, Culicidae, the gnat family, etc., may be found under their respective headings.

Flight, see FLYING.

Flight, Theory of, see AEROPLANE; AERONAUTICS; AERIAL NAVIGATION.

Flight-lieutenant, commissioned officer in the R.A.F., holding rank equivalent to a naval lieutenant or an army captain.

Flinders, Matthew (1774-1814), hydrographer, navigator, and explorer, b. Donington, Lincs. He entered the navy in 1789, and served in the *Bellerophon* at the battle of the 'glorious first of June.' In 1795 he went as midshipman in the *Reliance* to New South Wales, and spent his time studying the outlines and bearings of the Australian coast with George Bass, the surgeon of the *Reliance*. He explored the George R., and later much of the then unknown coast S. of Port Jackson. In 1798 he made a survey of the Furneaux Is., N. of Tasmania. In 1801 he sailed for Australia with sev. well-known scientific men in the sloop *Investigator*, and thoroughly explored the coast. On his return in H.M.S. *Porpoise* he was wrecked on a coral reef; on his rescue in the schooner *Cumberland* he was taken prisoner by the Fr. at Mauritius. His captivity lasted 6 years and ruined his health. He wrote many scientific and interesting works, among them *A Voyage to Terra Australis*, with a vol. of maps, 1814. See life by E. Scott, 1914.

Flinders Petrie, see PETRIE, SIR W. M. F.

Flinders Range, range of mts in South Australia. It extends from the N. of Spencer Gulf diagonally across the lake dist. of the S. for about 150 m. The heights are not lofty, the chief summits reaching from 1000 to 3100 ft. Mts Remarkable, Eyre, Serle, Arden, and McKinley are the most important.

Flindersia, genus of Australian hardwood trees, of the Meliaceae family. *F. australis* of New South Wales and Queensland, is regarded as one of Australia's finest hardwoods. It weighs over 50 lb. per cub. ft. and its greasy quality makes it more or less impervious to damp. Hence it is much used in dock works, flooring, shipbuilding, etc. It is yellow in

colour, with brown and white streaks, thus being suitable for cabinet work. See **TIMBER**.

Flint, Robert (1838-1910), philosopher and theologian. In 1864 he became prof. of moral philosophy at St Andrews Univ., and in 1876 prof. of divinity at Edinburgh Univ. He was also Stone lecturer in 1880, and Croall lecturer in 1887-8. Among his works may be mentioned *Christ's Kingdom on Earth*, 1865, *The Philosophy of History in France and Germany*, 1874, *Theism*, 1877, *Sermons and Addresses*, 1899, and *On Theological, Biblical, and other Subjects*, 1905.

Flint: 1. Bor. and cap. of Flintshire, North Wales. It is situated on the Dee estuary, 12 m. from Chester and 173 m. from London. There are important rayon works, smelting and iron foundries, paper mills, etc. F. Castle was begun in the reign of Henry II and completed by Edward I. It was here that Richard II was betrayed to Bolingbroke in 1399. In 1643 the Roundheads captured it. Pop. 14,257.

2. City, cap. of Genesee co., Michigan, U.S.A., on Flint R., 55 m. N.W. of Detroit. It manufs. automobiles, foundry products, structural steel, and chemicals, and is the seat of the Michigan School for the Deaf. Pop. 163,100.

Flint, hard brown mineral, consisting mainly of silica, found in chalk. It has a sp. gr. of 2.6, is frequently harder than quartz, is brittle and breaks with a conchoidal or shell-like fracture. In colour it ranges from dark brown to light yellow or grey. It occurs usually in nodular masses, but under the microscope exhibits a crystalline structure. Its composition resembles that of quartz; it is almost pure silica with traces of lime, iron, and organic matter. When received from the chalk the outer surface is opaque, rough, and greyish. On being broken it has a glassy lustre with cloudy, opaline, and speckled effects in its colouring. F.s are found usually in bands or layers in chalk, but are sometimes scattered. Layers of F. pebbles are common on riv.-beds and beaches in the E. of England, and concretions of the same nature are found under the name of chert in beds of limestone. The origin of F. is, to an extent, a matter of conjecture. The silica composing it was obtained from the skeletons of sponges and radiolaria. It evidently passed into solution, diffused through the porous mass of the chalk, and was precipitated in concretionary masses where the conditions of pressure, etc., were suitable. It appears to have taken the place of chalk, and fossils situated in the area of precipitation were outlined in silica. The uses of F. arise from its hardness, durability, and its abundance in certain dists. It is used for buildings and road making. When used for mending the surface of roads, some disadvantage results from its breaking up in angular fragments with sharp edges. Before the days of the lucifer match, flakes of F. were used for lighting tinder by striking them with a steel edge. They were also used for dis-

charging guns before the introduction of percussion caps; earlier still, tools and weapons were fashioned out of F. by dexterously breaking off flat or curved flakes by successive blows. At the present time F.s are ground down for use in the manuf. of earthenware of a superior kind. See also **FLINT IMPLEMENTS**.

Flint Glass, see **GLASS**.

Flint Implements, tools and weapons made from F. which, with others of similar tough fine-grained stone, are the earliest relics of man's activity. The first to be recognised as a piece of human workmanship was found in a London gravel pit about 1690 and is now in the Brit. Museum; and in 1797 worked F.s found 12 ft below the surface in a brick-earth pit at Hoxne, Suffolk, were recognised as of a period when metals were not known to man. The 19th cent. saw great advances in the study of F. I. in N. France and Great Britain, while systematic research in the present century has carried the enquiry to Asia, Africa, and America with outstanding success. It can now be said with some confidence that the earliest of man's tools in Europe are some half a million years old. Technological advance, however, has been far from uniform, and F. arrowheads were still in use in remote parts of N. Africa almost within living memory.

There has always been controversy about the earliest of man's efforts at making F. I., for it is sometimes held that these implements were formed by natural processes. The *Eoliths* ('dawn-stones') from the plateau gravels of N. Kent, and the 'sub-crag' implements from E. Anglia, are not now accepted as of human origin, but pebble-tools of lava and quartz found in E. Africa may perhaps carry man's antiquity there back nearly 1 million years.

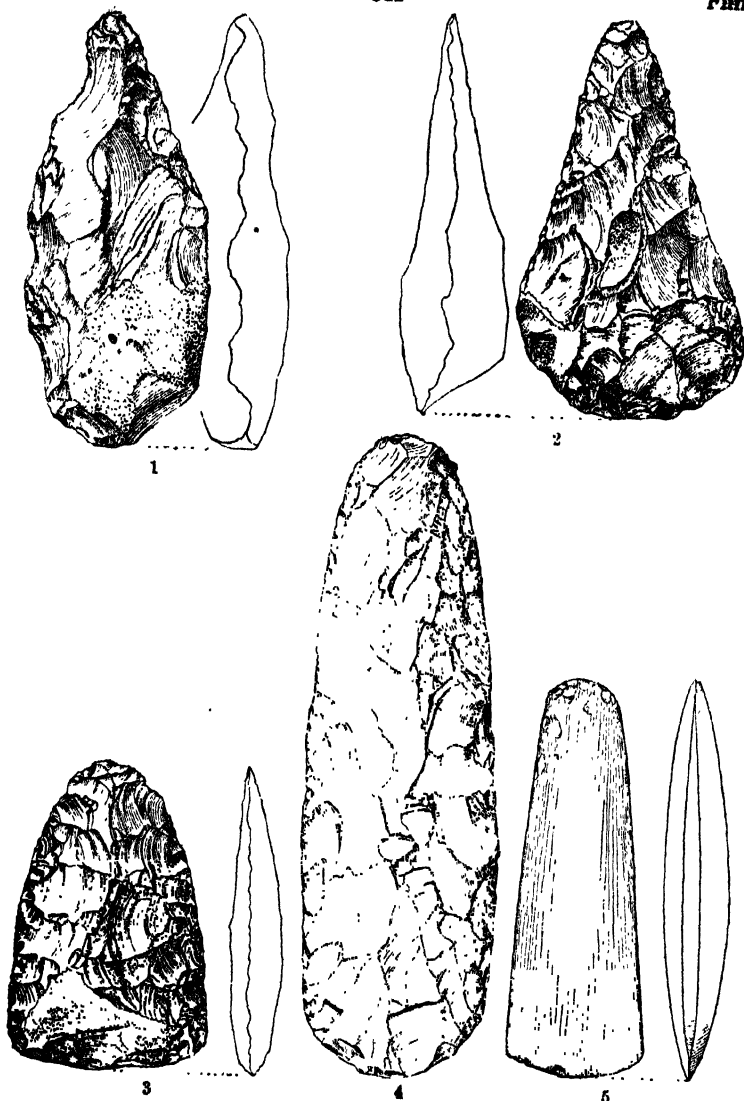
The F. I. of the *Palaeolithic* (Old Stone Age) fall into sev. well-defined cultures, though their manifestation is not uniform. The Lower Palaeolithic is characterised by hand-axes, general purpose tools used for cutting and scraping, and by coarsely flaked tools some of which were struck from tortoise cores: the cultures are the Abbevillian, Acheulian, early Lavalloisian, and Clactonian. The Middle Palaeolithic is distinguished by flake-tools and points with finely retouched edges, and scrapers and hand-axes used probably for skinning animals: the cultures recognised are the Châtelperronian, Aurignacian, Gravettian, Solutrean, and Magdalenian. The knives and points of these cultures were often well finished by pressure flaking, and show complete control and mastery of process and material. It should be remarked that there were great differences between the various Palaeolithic cultures as represented in Africa, Asia, and Europe.

In the *Mesolithic* (Middle Stone Age of Europe), F. tools include scrapers and borers, graves, untrimmed flakes used as tools, and very small implements called microliths which did duty as arrow-points, saws, and barbs for fish-spears,

Flint

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Flint



FLINT IMPLEMENTS

1. Pointed hand-axe of Abbevillean type from deep gravels at Fordwich, Kent; 2. Middle-Acheulean pointed hand-axe from Milton Street pit, Swanscombe, Kent; 3. Late Acheulean cordate hand-axe in highly finished technique, from Bournemouth, Hants; 4. Neolithic axe from Great Bealing, Suffolk; 5. Neolithic polished axe from the Thames at Teddington. (*The Trustees of the British Museum*).

The *Neolithic* (New Stone Age) saw the grinding and polishing of F. and other stone tools, and it was this technological advance, new in pre-hist., which first gave the stage its name. Axe-heads, arrow-heads, daggers, and sickle-blades of F. were in use, while axe-heads of other kinds of stone were widely traded from their centre of manuf.

Some tools of F. such as barbed and tanged arrow-heads, discoidal and plano-convex knives, and copies of bronze daggers were in use in the *Bronze Age*.

The various cultures to which F. I. are assigned are named after the places where they were first found or where they are best represented, and more than 40 such type-sites are now recorded.

Further information is contained in the articles PREHISTORIC, STONE AGE, and ARCHAEOLOGY, where bibliographies are provided, and from these articles it will be seen that F. I. provide only part of the story of early man. Their study and typology must be regarded as a means to this end, and not the end in itself.

Flint River, riv. in W. Georgia, U.S.A., with a length of 330 m. It joins the Chatahoochee at the SW. extremity of the state, and together they form the Apalachicola. It is navigable as far as Albany.

Flints, *Liquor of*, solution of flint or silica in potash (silicate of potash). This has the property of being soluble in water.

Flintshire, maritime co. of North Wales, the smallest Welsh co., consisting of a main portion with a detached part to the SE. The former is bounded by the Irish Sea, the Dee estuary, Denbighshire, and Cheshire, while the enclave is situated on the r. b. of the Dee, and bounded by Denbighshire, Cheshire, and Shropshire. The Clwydian Range lies on the SW. border of the co., which is drained by the Dee and Clwyd, the prin. rivs. The soil is fertile, and stock-raising and dairy-farming are carried on. There are manufs. of iron and steel, chemicals, and artificial silk; coal is mined in the co., though on a smaller scale than formerly. Iron, lead, copper, and limestone are worked, and there are potteries. The prin. tns are Mold (the co. tn), Flint, Holywell, Buckley; St Asaph is the seat of a bishop and Rhyl is a popular seaside resort. Area 256 sq. m.; pop. 145,100.

Flintwood, section of the Australian *Eucalypti*, yielding a hard, heavy, and durable timber, much used for railway sleepers, piles, and flooring.

Flinty Slate, see TOUCHSTONE.

Flitch, see DUNMOW.

Flitter-mouse, see BAT.

Floating Battery, vessel which is fully armed with cannon and used as a defence from or attack on an enemy. In the siege of Gibraltar (1779-83) the Fr. and Spaniards used them, but without success. They were used again in 1854 by the Eng. and Fr. against Russia.

Floating Beacons, see LIGHTHOUSE.

Floating Bridge may be a permanent construction used for ordinary traffic across a riv., or temporary, as used in

military operations. The former is built of pontoons or boxes of iron, on which is supported a roadway raised considerably above the water, the B. being securely connected at each end with the shore. In the temporary constructions the pontoons, which may be boats or rafts, are planked over to allow the men to cross the stream. Until it was replaced by a suspension B. a good example of a F. B. was that at Calcutta; it was over 1500 ft long, 48 ft wide, and was carried on 28 iron pontoons. It was constructed over the Hugli R., the bed of which is too loose and the current too rapid for permanent bridge foundations.

Floating Debt, see PUBLIC DEBT.

Floating Docks, see DOCK.

Flodden, Battle of, was fought on 9 Sept. 1513, about the base of the hill of F. in Northumberland, near Branxton, and 10 m. NW. of Wooler, between the Scots and the Eng. The Scots were under James IV and the Eng. were commanded by the earl of Surrey. Henry VIII was at Tournai prosecuting his war against the Fr. in connection with the 'Holy League.' James IV. of Scotland declared himself the active ally of France, crossed the border with an invading army of 30,000 men and took up a position on F. Hill, facing S. Surrey crossed the Till and drew up in the rear of the enemy, between it and Scotland. The Scots then took up a fresh position, facing N., on Branxton Hill. Each army was in 4 distinct bodies. After a devastating attack from the Eng. archery and cannon, the Scots rushed down the hill and came into close quarters. The earls of Huntly and Home got the better of the Eng. right, under Sir Edmund Howard, but only for a time; it soon rallied with the help of Lord Dacre's reserve corps. The Scots right, under Lennox and Argyle, was completely routed by Sir Edward Stanley. James, fighting bravely among his soldiers, attacked Surrey, but Stanley, turning about, attacked the king's corps in the rear. This corps fought to the last man, but the battle was decided—the Scots were most grievously defeated. They had lost their king, up to 10,000 men, and the flower of all the noble families of Scotland. The Eng. loss was 5000 men. See Scott's *Marmion*, where the battle is described with some accuracy and some imagination, and A. Mure Mackenzie, *The Rise of the Stewarts*, 1935.

Flogging and Whipping. The powers of the courts to pass a sentence of corporal punishment were abolished by the Criminal Justice Act of 1948, both for adults and juvenile offenders.

Before 1948 the courts could order the F. or W. of a male adult as follows: (1) under the Vagrancy Act, 1824, for a second or subsequent offence of indecent exposure, sleeping out, failure to support a family, etc.; (2) under the Larceny Act, 1916, for robbery with violence and armed robbery; (3) under the Criminal Law Amendment Act, 1912, on indictment for procuring, for a second or subsequent offence of living on immoral earnings or soliciting for immoral purposes.

There were also powers under certain acts that were practically obsolete. In practice corporal punishment was almost entirely limited to robbery with violence.

It is noteworthy that although crimes of violence as a whole have increased since 1948, when corporal punishment was abolished, robbery with violence has decreased. Corporal punishment still remains as a punishment for mutiny in prison or gross personal violence to a prison officer. It can only be ordered by the visiting justices or board of justices and the order must be confirmed by the secretary of state.

In Scotland corporal punishment for prison offences was limited to the convict prison at Peterhead, but the Criminal Justice Act (Scotland) abolished this as well as corporal punishment by order of the courts.

'Floire et Blanchefleur,' medieval legend, probably of Oriental origin. Writers in most of the European countries, including Boccaccio in Italy, told the tale from the Fr. version. It is the story of 2 children who loved each other, were separated, and who came together again happily after passing through many difficulties and dangers. Gaston Paris says that the *chante-fable*, *Aucassin et Nicolette* (q.v.), is another form, though greatly altered, of this story. See the poem in Eng. ed. by A. Lang, 1910 (Early Eng. Text Society).

Flood, Henry (1732-91), statesman, entered the Irish Parliament in 1759, and in 1773 held office as vice-treasurer of Ireland. At one time he joined forces with Grattan (q.v.) in order to endeavour to translate into reality their dream of an independent Irish Parliament; but, differing on other matters, especially on Catholic emancipation (q.v.), they quarrelled, and in 1783 were within an ace of fighting a duel. In that year, though still an Irish member, he was returned to the Eng. House of Commons, but there he was less successful, and made little or no mark in that assembly. He was an able parliamentarian, and one of the greatest orators that Ireland has ever produced. There is a biography by Warden F., 1838.

Flood, the, described in the book of Genesis. Traditions of such a F. are found among many races besides the Hebrews, e.g. among the Indians, Persians, Babylonians, Syrians, Americans, and Polynesians, and there is the classical story of Deucalion related by Ovid. The Babylonian accounts are most interesting ones and show remarkable parallels with the biblical version. They agree with the latter in making the F. a punishment for sin, but the theology is frankly polytheistic. These traditions speak of the F. as covering the whole earth, and the biblical account naturally suggests this to us; but it has been pointed out that Heb. idiom uses universal expressions with restricted reference to the subject matter in hand—i.e. to Mesopotamia. The accepted view of the F. now is that it was partial and local, possibly owing its origin to a sudden and extraordinary rising in the Euphrates

valley, occurring at the same time as a great rainfall. Excavations in Mesopotamia have shown evidence of many severe and extensive F.s at various levels. Sir Leonard Woolley found at Ur (q.v.) 8 ft of clay laid by a F.-so prolonged that it was identified by him with the Bible F. See also ZIUSUNRA. See H. Usener, *Sintflutsagen*, 1899; G. Gerland, *Die Mythos von der Sintflut*, 1912; C. L. Woolley, *Ur Excavations*, 1927; and H. Peake, *The Flood: New Light*, 1930.

Floods and inundations are due most commonly to excessive rains or melting snows, which cause rivs. to rise and overflow their banks. Some rivs. present this phenomenon annually. The rising and falling of the Nile in this way is no disaster, but has been made by man the basis of Egyptian agriculture. The Mississippi, the Missouri, and the Ohio valleys are liable to F., and these can be predicted with comparative accuracy; great I. occurred in 1897, in 1927, and in 1937, the last being the most serious since records of the riv. and of its tribs. have been kept, over 1,000,000 persons being made homeless. In China the Hwang-ho R. is especially liable to become swollen after leaving its mountainous region and entering upon its long, low delta course. Levees 70 ft high proved ineffectual in the disaster of 1887, when 1,000,000 people were drowned and tens of thousands perished by disease and famine ensuing. In 1938 breaches in the bank of the Hwang-ho (or Yellow R.) caused either by the Chinese themselves or by Jap. gunfire flooded thousands of sq. m. of land, killed many thousands of people, and held up the Jap. advance in the prov. F. in the Yangtze and Yellow riv. valleys (China) in summer 1949 made 20 million people homeless. The breaking up of ice and glacier dams cause I. in the valleys of the tribs. of the Indus. Riv. F. less catastrophic in nature, but sufficiently disastrous, occurred in France in Jan. 1910, and in England in the summer of 1912 and in 1952 (Lynmouth). In France heavy rains caused the waters of the Marne, Loire, Yonne, and other rivs. to flood their valleys: this swelled the Seine and Paris was inundated.

In England, following a rainfall unprecedented in the records of the meteorological office, many of the E. and midland cos., especially Norfolk and Suffolk, suffered disastrous F. in Mar. 1947 after prolonged snow storms and rain. Flood waters spread in the Thames valley, the record levels of 1894 being passed, and below Chertsey the riv. was 3 m. wide. There was an unbroken stretch of water from Windsor to Weybridge and the F. were 6 ft deep in places. Troops and prisoners of war were drafted into the Fen country for anti-flood work, where there were sev. breaches in the banks of the Great Ouse. The Severn valley was flooded for over 40 m. from Caersws to Shrewsbury. There was extensive flooding in the E. Riding of Yorks when the Derwent overflowed its banks from Malton to where it joins the Ouse, a

distance of 50 m. Altogether there were F. in some parts at least of 30 cos., and the area mainly affected covered almost the whole of central England roughly in a square with its 4 corners in mid-Wales, Lincs, Somerset, and Essex. Disastrous F. in the Anhwei and Kiangsu provs. in China, Aug.-Sept. 1950, destroyed or damaged almost 1 million houses and affected about 10 million people. 1954 was an abnormal year, when heavy storms caused extensive F. in Bavaria, Austria (Danube and tribs.), Italy, and Yugoslavia in summer; also in Great Britain and Ireland (R. Shannon, Dec.). F. in Persia, India, and China drowned thousands of people during July and Aug. 1954. Very severe F., which were considered the worst for 85 years, occurred in Uttar Pradesh, India, in July-Aug. 1955, leaving more than 5 million persons homeless; and in Sept. in the Indus valley, India, affecting about 45 million people. The state of Kentucky suffered one of the most devastating F. in history early in 1957. In June 1957, violent storms and F. caused heavy destruction in the Po valley (Italy), Val d'Isère (France), Austria, and Switzerland. 'Tidal waves,' occurring when high winds drive the waters of the sea on to the land at periods of high tides, are a less frequent cause of inundation. Notable F. of this nature occurred in the Netherlands in 1421, but the construction of more and more invulnerable dikes has made the country decreasingly subject to these disasters. Inundation by the sea may cause serious F. as in Bengal in 1876, when 200,000 lives were lost, and again in 1937, when 300,000 people were killed; and, more recently, in the Netherlands, Jan.-Feb. 1953, when N. Sea storms and tides flooded the S. of the country, killing about 2000 people and leaving 100,000 homeless. The West Indies, the Gulf Coast, the Middle Atlantic States, etc., are liable to inundation at the periods of tropical hurricanes. Earthquake shocks disturbing the sea may cause inundation of the adjoining land; the catastrophe in which Lisbon was destroyed in 1775 was of this nature. Devastating F. have been caused by the bursting of reservoirs; that of the Bradford reservoir, Sheffield (1864), is an instance. *See also* FENS. *See* C. E. Brooks and J. Glasspoole, *British Floods*, 1928; Institution of Civil Engineers, *Interim Report of the Committee on Floods in Relation to Reservoir Practice*, 1933; B. D. Richards, *Flood Estimation and Control* (2nd ed.), 1950; *The Battle of the Floods: Holland in Feb. 1953*, 1953.

Floorcloth, term applied to a number of materials used as substitutes for carpet. These include oilcloth, linoleum (q.v.), kamptulcon, corticine, cork carpet, etc. Oilcloth consists of coarse canvas (burlap) made of jute or flax, to which a coating of size and sev. coatings of thick oil paint are applied. It is then often ornamented with patterns. This hard and cold F. was partly superseded (1844) by kamptulcon, made of ground cork and

indiarubber; it was expensive and is now little used. Cork carpet is a F. now extensively employed; it is warmer than the others and deadens the sound of the footsteps. It is made of a preparation of ground cork and oxidised linseed oil reduced to a pulp and pressed in a machine; it has a canvas backing. There is more cork in this than in linoleum, which is, however, extremely popular. Rubber flooring is widely used either in sheet or tile form and is manufactured in every variety of marbled and plain colouring.

Floors. The F. referred to as 'ground floor,' 'first floor,' etc., in Britain are known as 'first floor,' 'second floor,' etc., respectively, in America.

F. are designed primarily to support the loads they are intended to carry; they should also be sufficiently resistant to the spread of fire and may need to provide sound and heat insulation. Solid F. on the ground may need to include membranes to stop rising ground moisture. *Suspended F.* span between walls or beams; in small buildings they may be of timber joists carrying boards; for greater strength and fire resistance, the beams may be of steel or reinforced concrete, with hollow clay blocks in between, or reinforced concrete slabs may be used. *See also* BUILDING.

Floquet, Charles Thomas (1828-96), Fr. statesman, b. St Jean Pied-de-Port. In 1876 he became a member of the chamber of deputies, of which he was president from 1885 to 1888, and prime minister in the latter year. In 1888 he wounded Boulanger in a duel, and in the next year resigned from his office. He was com-
career
con-

Flora, Rom. goddess of the spring, of flowers, and of the 'flower of youth.' The *Floralia*, a theatrical festival in her honour, from 28 April to 3 May, was noted for licentiousness and unrestrained merriment.

Flora, term used to denote (1) all the plants that grow in a particular region, country, or locality; (2) all the plants of an epoch of time, such as the Miocene F.; (3) a book that describes plants so grouped.

Florac, Fr. tn, cap. of an arron., in the dept of Lozère, on the Tarnon. It has an ant. château and convent. Pop. 1500.

Floral Decoration, *see* FLOWER DECORATION.

Floralé (month of flowers), 8th month of the year in Fr. revolutionary calendar. *See* CALENDAR.

Florence (It. *Firenze*): 1. Prov. of Italy in N. Tuscany (q.v.). It is generally mountainous, with ranges of the N. Apennines (q.v.), but has a plain in the E. The broad and fertile valley of the R. Arno (q.v.) crosses the prov. SE.-NW. and then E.-W. Sheep are raised, and wine, fruit, flowers, olive-oil, and silk are produced. The prin. tns include F., Empoli, and Prato (qq.v.). Area 1497 sq. m.; pop. 942,000.

2. (ancient *Florentia*) It. city, cap. of the prov. of F., and chief tn. of Tuscany, 104 m. NNW. of Rome (q.v.). It is situated at the foot of the Fiesole (q.v.) hills, in the fertile valley of the Arno, on both banks of the riv. F. is well called *la città dei fiori* for flowers grow in luxuriance in its gardens and fields. The greater part of the city is on the N. bank of the riv. It has long since spread beyond the confines of its 2 circles of ancient walls (the inner circle c. 800; the outer circle medieval) of which only a few towers remain. There were modern extensions in 1865-71, when F. was the cap. of Italy, and there has been continuous growth since then. The city, with its riv., bridges, cupolas, market places and fine squares, its streets and encircling boulevards, is a marvellous sight, which is well seen from the *Piazzale Michelangelo*, the highest point of the *Viale dei Colli*, a magnificent promenade of modern construction in the hills to the S.

The riv. is at present crossed by 8 bridges, some of them temporary erections taking the place of bridges destroyed by Ger. mines in 1944. The only bridge then to escape destruction was the picturesque Ponte Vecchio (1345), the oldest in F. This is lined with goldsmiths', silver-smiths', and jewellers' shops, and links the Palazzo Vecchio with the Palazzo Pitti. The bridge of Sta. Trinità has been rebuilt to its original plan, on which Michelangelo (q.v.) is said to have offered advice. The most remarkable building of F. is the archiepiscopal *duomo* (cathedral) of Santa Maria del Fiore. It was begun by Arnolfo di Cambio in 1296, and consecrated in 1436, when it was called 'del Fiore' (of the flower) either after the name of the city or in reference to the municipal arms, a red lily on a white ground. Its detached campanile was begun by Giotto (q.v.), and Brunelleschi (q.v.) designed its famous dome. In front of the *duomo* is the octagonal baptistry of San Giovanni, the old cathedral. Of its 3 splendid bronze doors 1 is the work of Andrea Pisano (q.v.), and the other 2, called by Michelangelo in admiration 'The Gates of Paradise', are the masterpiece of Ghiberti (q.v.). Other famous churches are: Santa Maria Novella (14th cent.); Santa Croce, the pantheon of F., with frescoes by Giotto; San Lorenzo, begun by Brunelleschi, near to which is the Medici Chapel (q.v.); Santa Maria del Carmine, containing frescoes by Masaccio (qq.v.); and San Marco, the convent of which has frescoes by Fra Angelico (q.v.) and was the home of Savonarola and Bartolommeo (qq.v.). The streets of F. are renowned for their splendid medieval and Renaissance palaces and mansions, once the residences of the Florentine nobles: the Palazzo Vecchio, the tn hall, with its superb tower (Torre di Arnolfo), has statues by Donatello (q.v.) and Michelangelo; the Palazzo Medici-Riccardi, was the home of the Medici (q.v.) until 1540; the Palazzo Pitti and the Palazzo degli Uffizi (the latter of which is the greatest art gallery in Italy) contain masterpieces by Raphael, Andrea del Sarto, Perugino,

Ghirlandajo, Botticelli, and the Lippi (qq.v.), amongst others. There are other rich collections of artistic and historical treasures, and there are 9 important libraries, of which the Biblioteca Nazionale (1747) contains 3,500,000 vols., and the univ. library contains 1,400,000 vols. The univ. (1391) is one of the first in Italy, and there are many trade and professional schools, and some important learned societies, such as the Accademia della Crusca (q.v.) for the study of the It. language, and the Società Danteasca. The prin. industry is tourism, and there are manufs. of pottery, cigarettes, textiles, and jewellery. F. is a junction for trans-Appennine road and rail (F.-Bologna, q.v.) traffic. Pop. (city) 313,400; (com.) 370,500.

History.—*Florentia*, an old Rom. colony, was rebuilt by Julius Caesar (q.v.) in 58 BC to protect the ford of the Arno. It rose to some importance under the Carolingians (q.v.) and was included in the Tuscan margravate. It was bequeathed to Pope Gregory VII by Matilda (q.v.) of Tuscany, and became, in consequence, a source of conflict between the popes and the emperors. F. stood for the papacy, but early began to develop a spirit of local patriotism and of freedom, and soon became bold and strong enough to close her gates against the Emperor Frederick I (q.v.). The Florentines were already great traders, and they now formed themselves into *arti* or trade guilds; in order to hold public office it was necessary to belong to one of these guilds. The citizens waged war against the feudal lords whose castles were in the neighbourhood, forcing them to become citizens and to live in F. for at least 3 months in the year. F. gradually threw off the rule of the emperors, and after the death of Frederick II (q.v.) was proclaimed a rep. In the 12th and 13th cents. it was involved in the struggles between the Guelphs and the Ghibellines (q.v.). F. was chiefly Guelph, and formed with other cities the 'Tuscan League', which fought against Pisa, Siena (qq.v.), and other Ghibelline tns. The rich burghers, with their guilds, now divested the nobles of power by the 'Ordinances of Justice.' The executive power, formerly residing in the *podestà* and captain of the people, was now transferred to the *priori* (8 members) and the *gonfaloniere* of justice. And now F. was torn by the feuds of the Neri and Bianchi ('blacks' and 'whites'), 2 factions born of the opposition of the nobles to the new constitution. Dante was one of the Priori, and was banished with the whites in 1302. In spite of the constant fighting entailed by these feuds, F. grew in splendour and prosperity—fine churches, palaces, and libraries were built, Florentine cloth merchants, jewellers, and goldsmiths visited all the foreign markets and estab. banks everywhere, about 400,000 gold florins were minted every year, and the city was a centre of art and letters. All this was made possible by the solidarity of the trade guilds. In 1348

decimated by plague, the Black Death, described by Boccaccio. From 1434 to 1537 the Medici held sway, and under them F. attained the summit of its magnificence. Cosimo, the first of the name, a princely merchant, was very popular, and rose to a position of great power. Lorenzo de' Medici, called the Magnificent, was the most famous and powerful of the family. They were sev. times banished for aiming at sovereign power, and were many times recalled. They patronised art and letters, and a school of painters came into being, represented by Cimabue, Leonardo, Giotto, the

troops reached the outskirts of the city on 4 Aug. 1944, and on the 11th the Allies took F. The great monuments, most of which lie N. of the R. Arno, escaped undamaged because, though the Germans held the N. bank, the Brit. troops deliberately abstained from firing upon them. No damage of any significance is attributable to Allied action. But to the historic tn of F. the damage was very heavy. On the N. bank the heart of the old city round the Ponte Vecchio, with all its associations, is gone. The bridge itself escaped serious damage, but the old houses on it suffered severely from blast,



FLORENCE: THE PONTE VECCHIO

W. F. Mansell

The bridges in the background were destroyed in 1944.

Lippis, Del Sarto, and others. F. was the centre of the Renaissance. But the succeeding members of the Medici family degenerated in character, and with them, to some extent, the Florentines. The work of Savonarola, who tried to reform the manners and morals of the citizens, and to re-establish a democratic gov. after the city had been delivered from the Medici, took place in the latter part of the 15th cent. He was abandoned by the people and burnt at the stake. F. ceased to be an independent rep. in 1532 to become the cap. of the grand-duchy of Tuscany. In 1808 Tuscany, and F. with it, was annexed to the Fr. Empire, and in 1865 the city became the cap. of the kingdom of Italy, and remained the cap. until 1871. F. was the bp. of Dante, Donatello, Ghiberti, Machiavelli, and Florence Nightingale (qq.v.).

In the Second World War South African

and most of the old houses on the S. bank were totally destroyed. As early as Mar. 1944 the Germans had made a photographic survey of the area they subsequently mined and ruined, including the narrow approaches. On the S. side of the riv. the whole of the Via de' Guicciardini, from the Pitti Palace to the riv., was destroyed, and the whole of the famous view looking up the riv. to the Ponte Vecchio, with the medieval houses reflected in the water, is lost for ever, together with 3 of the old Florentine towers, and the 18th Bagno dei Medici. Twelve palaces were either completely destroyed or ruined beyond repair, amongst them the Casa Macchiavelli and the Casa del Giambologna. The Casa del Torre de' Bardi collapsed, and with it the Columbaria library and its MSS., though half these latter and most of the ant. library were saved by the prompt action.

of the Allied Monuments, Fine Arts, and Archives officers. On the N. side of the riv. other old towers were destroyed, including the Torre degli Amidei, the best-preserved of all the Florentine towers. Among *palazzi* destroyed or damaged were the Acciaiuoli, de Angelis, and Buonellmonte. A great loss was that of the old houses—the Piazza del Pease, right up to the church of San Stefano, which itself was damaged, the Via Por Santa Maria, and with these have disappeared all the most characteristic remains of medieval F. By contrast the area which the Germans held against Allied attack was relatively immune, and, apart from the Columbaria, the libraries and archives did not suffer. From the galleries of F. all the more important pictures had been removed to places of safety outside the city limits. Of the villas round F. many suffered damage, but the most important fared best on the whole. See ITALIAN FRONT, SECOND WORLD WAR CAMPAIGNS ON; and H.M.S.O., *Works of Art in Italy, Losses and Survivals*, 1945, 1946.

See also G. A. Capponi, *Storia della repubblica Firenze*, 1875; Margaret Oliphant, *Makers of Florence*, 1876; F. Perrens, *L'Histoire de Florence*, 1877–92; P. Villari, *The Two First Centuries of Florentine History* (Eng. trans.), 1894, and *Life and Times of Savonarola* (Eng. trans.), 1888; J. Ruskin, *Mornings in Florence*, 1801; E. Staley, *The Guilds of Florence*, 1906; J. Wood Brown, *Florence Past and Present*, 1911; F. Schillmann, *Florenz und die Kunst Toskanas*, 1929; T. Borenhus, *Florentine Frescoes*, 1930; G. True, *Florence et les Médicis*, 1936; and S. Antal, *Florentine Painting and its Social Background*, 1947.

3. City of Alabama, U.S.A., co. seat of Lauderdale co., situated on a plateau 200 ft above the Tennessee R., on its N. bank. Its industries are connected with lumber, coal, and iron-mining. Pop. 23,900.

4. Co. seat of F. co., South Carolina, U.S.A. Its industries include tobacco and cotton growing. It is a rail junction, a manufacturing, trade, and shipping centre, and has lumber-milling and printing, foundries and machine shops. Pop. 22,513.

Florence of Worcester (d. 1118), chronicler. Little is known of his life, except that he was a monk of Worcester. He wrote the *Chronicon ex Chronicis*, beginning with the creation and ending in 1117. John of Worcester continued the work up to 1141. The section of the work of value to the historian is that covering F.'s own life. It was trans. and ed. by B. Thorpe in 1848.

Florentia, see FLORENCE.

Flores, Juan José (1800–64), Sp.-Amer. soldier, b. Puerto Cabello, Venezuela. He became first president of Ecuador, and fought under Bolívar in the War of Independence. He was commander-in-chief in the campaign against Peru, and when Ecuador became independent (1830) he framed her constitution and was elected president.

Flores: 1. Is. of the Lesser Sunda,

Indonesia, situated between the F. sea (N.) and the Savu Sea (S.). Area c. 5850 sq. m. Volcanic and mountainous, rising to 8000 ft. Agric. products include rice and maize. Sandalwood and copra are exported. The chief tn and port is Ende. The Dutch connection began in 1618. Occupied by the Japanese in the Second World War, F. became part of Indonesia in 1950.

2. Is. of the Azores (q.v.).

3. Dept of Uruguay. Its chief tn is Trinidad on the railway to Durazno and the main road to Montevideo. Sheep are reared; corn and wine are produced. Area 1744 sq. m.; pop. 36,100.

Florey, Sir Howard Walter (1898–), Australian pathologist, b. Adelaide, where he received his medical education and qualified in 1921. Awarded Ph.D., Cambridge, 1927. He was prof. of pathology at Sheffield Univ., 1931–5, and since then has occupied the chair of pathology at Oxford. His most im-

and by 1940 he was able with his colleagues to introduce penicillin as a valuable therapeutic agent. For this work he shared the Nobel prize with Sir Alexander Fleming and E. B. Chain (qq.v.) in 1945. He is the recipient of many other honours, including a knighthood in 1944. Pubs. include contributions to scientific journals on physiological and pathological subjects; *Antibiotics*, Florey and others, 1949; *Lectures on General Pathology*, ed. Florey, 1954.

Florian, Jean Pierre Claris de (1755–94), Fr. poet, novelist, and dramatist, b. château of F. near Saure. His uncle, the marquis of F., introduced him to Voltaire, who greatly influenced his ideas on literature. He obtained a commission in a dragoon regiment, but at the beginning of the revolution he retired to Sceaux, where he was captured and imprisoned. He only lived a few months after his release. One of his first literary works was an eclogue entitled *Kudh*, crowned by the Fr. Academy in 1784. He wrote many poems and comedies; among them are *Le Bon Ménage*, *Le bon père*, *La bonne mère*; and novels of peasant life; also *Numa Pompilius*, and *Galatée*. In 1792 he wrote his famous *Fables*, and trans. *Don Quixote* into Fr. His style was sentimental, and his comedies are delicately expressed with a certain amount of charm and piquancy. He was elected to the Academy in 1788.

Florianopolis (formerly **Desterro**), city and seaport of Brazil, named after Marshal Floriano Peixoto, president of that country (1891–4). It is situated on the W. side of the is. of Santa Catarina off the coast of the state of Santa Catarina, of which it is the cap. Agriculture is the prin. industry and dairy produce is largely exported. The port affords good accommodation for smaller vessels. A suspension bridge, joining the city to the mainland, was completed in 1926. Pop. 52,000.

Florida (Land of Flowers), 'peninsula' or 'everglade' state, the most S. of the states of the U.S.A. It lies between the Atlantic and the Gulf of Mexico, and across the Straits of Florida from Cuba; it is bordered on the N. by Georgia and N.W. by Alabama. Its length is 400 m., its average width 95 m., and its area 58,560 sq. m., about 4298 of which are lake and riv. Its surface seldom rises more than 200 ft. above sea-level: the highest point, in Walton co., is 345 ft. Lakes, swamps, and savannah are common in the centre, while the S. is characterised by submerged sawgrass called everglades. F.'s largest lake, Lake Okeechobee (730 sq. m.), contributes a subterranean supply to the everglades. The prin. rivs. are the St Johns (285 m. long), St Marys, Withlacoochee, and Caloosahatchee. The climate of F. is so equable and healthy that the state has often been called the Amer. Riviera, and it has become a favourite health resort and winter playground. F.'s prin. source of income is tourism (one-third of the state's total income). The leading industries are those connected with agriculture (cereals, peanuts, potatoes, tomatoes, beans, tobacco, celery), and F. supplies 40 per cent of the truck crop of the South and 10 per cent of that of the U.S.A. Other important industries are lumber (yellow pine, cypress, red cedar, oak, and catalpa grow in abundance) and fruit-growing (oranges, pineapples, limes, grapefruit, and so on). A newer development is the growing of sugar-cane around the Lake Okeechobee dist. Between the truck and citrus areas are the chief cattle areas of the state, the Kissimmee Prairies, centred on Kissimmee and Arcadia. F. ranks second in beef cattle among states E. of the Mississippi. Wood manufs. are also important. F. ranks second in naval stores production, and leads the U.S.A. in cigar-making. F. also produces 50 per cent of the shrimp output and 95 per cent of the sponge output of the U.S.A. Commercial fishing at Apalachicola, Fernandina, Pensacola, St Augustine, Smyrna, Stuart, and in the F. Keys is important. F. produces 70 per cent of the U.S.A. phosphate output. Limestone, sand, and gravel are other products. The pop. is 2,771,305. The chief tns are Miami, 249,276; Jacksonville, 204,517; Tampa, 124,681; St Petersburg, 96,738; Orlando, 52,367; Pensacola, 43,479; West Palm Beach, 43,102; and Tallahassee (cap.), 27,237. Institutions of higher learning include the univ. of F. (Gainesville), univ. of Miami (Coral Gables), F. State Univ., and F. Agric. and Mechanical College (Tallahassee), Rollins College (Winter Park), F. Southern College (Lakeland), John B. Stetson Univ. (De Land), Barry College (Miami), the Bethune-Cookman College (Daytona Beach), and the univ. of Tampa. F. was discovered in 1512 by Ponce de León, was ceded by Spain to England in 1763, became an Amer. possession in 1821, a ter. of the U.S.A. in 1822, and was admitted to the Union in 1845. See C. H.

Brevard, *A History of Florida from the Treaty of 1763 to Our Own Times*, 1924-5; F. W. Dau, *Florida, Old and New*, 1934; and Kathryn T. Abbey, *Florida: Land of Change*, 1941.

Florida, dept of Uruguay, whose cap. of the same name (pop. 16,000) is c. 70 m. N. of Montevideo. Agriculture and dairying are the prin. occupations. Area 4670 sq. m.; pop. 107,000.

Florida Keys, bow-shaped chain of small is. and sand reefs (or keys) extending SW. for 150 m. from Virginia Key. They parallel the E. coast of F. and enclose an inland waterway. The ports Fernandina, Jacksonville, and Key West (southernmost city in U.S.A.) are on the F. K. There are active sponge and commercial fishing industries.

Floridsdorf, see VIENNA.

Florin (Fr. *florin*, from It. *florino*, a florin, the word being derived from *florē*, a flower, because the coin bore a lily on the obverse), name first given to a gold coin struck in Florence in the 11th cent. It was called also a 'florencia' in Europe, and was much used in commerce, other countries issuing similar coins. In England Edward III ordered every pound of gold to be coined into 50 florences (value 6s. each); and the 'gulden' and 'guilders' of Germany and Holland came into being. Edward's florences were soon discontinued, but in 1849 Queen Victoria issued a silver F. (2s.), which became known as the 'godless' or 'graceless' F., because the words *Dei Gratia* were omitted; this omission was rectified in 1852. The double F. of 1887 was discontinued in 1890.

Florina (Filurina), dept of Gk Macedonia. Pop. 69,400. Cap. F. (12,300).

Florio, John (c. 1553-1625), author and translator, b. London, son of It. Protestants who had taken refuge there. He became a prof. of languages at Oxford, and in 1603 was appointed to read Italian with Queen Anne, being made groom of the chamber in the following year. He also taught Prince Henry, son of James I. He is best known by his trans. of Montaigne's essays, 1603, in stately if somewhat stiff Elizabethan Eng. Among his other works are *Florio his firste fruites which yielde familiar speech, merie proverbes, wittie sentences and golden sayings, also a perfect Introduction to the Italian and English Tongues*, 1578, and *A Worlde of Wordes or most Copious and Exact Dictionarie in Italian and English*, 1598. See F. A. Yates, *John Florio*, 1934.

Floris, Frans (1516-70), Flem. painter whose real name was de Vriendt, b. Antwerp. He began as a sculptor under his father, and later went to Liège, where he studied painting under Lambert Lombard. He then visited Italy, and while in Rome studied the work of Michelangelo (q.v.), which left evident traces on his style. In 1540 he opened a school of painting in Antwerp. Among his best works are: 'The Last Judgment' (in Brussels); 'The Fall of rebellious Angels' (in Antwerp). His brother Cornelius (1514-75) was an architect and sculptor, whose chief work was the tn hall at Antwerp.

Florists' Flowers, *see* FLOWERS, FLOWERS'.

Florus, Lucius Annaeus (A. C. AD 150), Rom. historian, author of *Bellorum Romanorum Libri II*. This work, which is based principally on Livy, traces the rise and eclipse of Rom. military power down to the reign of Augustus. There is an ed. with trans. by E. M. Forster (Loeb Library, 1929).

Flory (in heraldry), *see* FLEURY.

Flotation, study of the conditions under which bodies float. If the weight of a body be greater than the weight of the fluid displaced, the body will tend to sink; if the weight of the body be equal to that of the displaced fluid, it will rest anywhere in the fluid; if the weight of the fluid displaced be greater than the weight of the body, the body will be forced upwards to the surface, so that it floats partly immersed. As the pressure upwards upon a floating body must be equal to the pressure downwards due to the weight of the body, it follows that the weight of the fluid displaced is equal to the total weight of the body. It also follows that the pressure upwards shall act in the same straight line as the pressure downwards, so that the centre of gravity of a floating body is in the same vertical line as the centre of buoyancy, or the centre of gravity of the displaced fluid. If the body be slightly displaced, the moment of the 2 forces tends to restore it to its original position or tends to overturn it. Hence the necessity for keeping the centre of gravity of a ship as low as possible, because the higher it is the greater is the danger of its being above the metacentre (q.v.). A certain amount of displacement is inevitable, and if the centre of gravity be raised by heavy deck loads there is risk of capsizing, while the lowering of the centre of gravity by ballasting tends to ensure stability. *See* HYDROMETER and SPECIFIC GRAVITY for the use of F. in the determination of sp. gr. *See* *Extraction Metallurgy* under METALLURGY for F. as used in the treatment of ores. *See* also HYDROSTATICS; ARCHIMEDES PRINCIPLE.

Flotow, Friedrich, Baron von (1812-83), Ger. composer, b. Teutendorf in Mecklenburg. His first great success was *Le Naufrage de la Méduse*, an opera produced in Paris (1839), and he wrote sev. other Fr. operas before he made his greatest success with the Ger. *Alessandro Stradella*, in 1844, and *Martha*, in 1847. None of his 15 later operas achieved the same popularity, although the fact that they were in German, Fr., Italian, and Russian shows that he was widely famous in his time. The characteristics of his works are liveliness and grace, combined with pleasing melodies.

Flotsam, Jetsam, and Ligan, names given in Eng. law to goods lost at sea as distinguished from *wreck* or goods which come to land. *Flotsam* 'is where goods continue swimming on the surface of the waves' (Blackstone). *Jetsam* or *jettison* connotes goods cast into the sea which remain under water; *ligan* are goods which are attached to a cork or buoy in order

that they may be found again. F., J., and L. are adjudged to the Crown if no owner appears within a year and a day, while *wreck* belongs to the Crown in any case.

Flounder, or *Pleuronectes flesus*, flat fish (q.v.). It is common to the N. temperate and Arctic seas of both hemispheres, and is almost as much an estuarine fish as a sea fish. The F. rarely exceeds a length of 12 in., or a weight of 1½ lb., but those caught in America are larger and heavier. Nearly all F.s are excellent eating.

Flour (the word is a variant of *flower*), in general language the powdered grain of wheat. When the word is used to denote the powdered grain of other cereals, a qualifying term is added—rye F., barley F., etc. Wheat F. is used for making bread in preference to the F. of other grains, not on account of any superiority in its nutritive properties, but because of the presence in it of a special gluten, a highly tenacious, sticky substance which enables the dough to retain the carbonic acid gas introduced into it in the form of yeast or baking powder. This makes the bread light and spongy. Dough made with the F. of other grains is granular, and this allows the gas to escape. The following comparison shows that in essential nutritive constituents other grains equal or surpass wheat:

	Protein	Sugar, starch, etc.
Wheat . . .	11.9	71.9
Oats . . .	11.8	59.7
Barley . . .	12.4	69.8

The best bread-making wheat in commerce comes from the prairie provs. of Canada. Great Britain imports F. from Canada and, to a lesser extent, from Australia, the total amounts approximating to 6-10 per cent of the total consumption.

The main types of F. produced commercially are bread F., biscuit F., and household F. (including self-raising F.), each type possessing its own characteristics and baking qualities; normally each separate type is produced from a mixture of wheats specially blended by the miller for that purpose.

Bread F. comprises sev. categories: 'patent' F. is fine white F. of high quality milled at a low extraction rate; 'standard' F. is white F. milled at an extraction rate of approximately 70 per cent; 'brown' or 'wheatmeal' F. is F. produced at an extraction rate of 80-95 per cent and from which the coarsest fragments of the bran have been excluded. 'Wholemeal' or 'wholewheat' F. signifies F. of an extraction rate of 95-100 per cent; the latter term more strictly defines F., comprising the wholewheat from which nothing has been extracted during the milling process.

Flour-milling. Ancient method.—More than 6000 years ago people ceased to eat grain in its wild state and began to break it up with a rude kind of pestle and mortar. Later a primitive hand mill came into use. This consisted of 2 stones with roughened

surfaces between which the grain was ground. The next mill evolved was the *quern*, formed of 2 circular stones, the upper revolving on the lower, to which it was attached by a metal or wooden pin. The corn was introduced between the stones by means of a funnel in the upper stone which had also a small hole near its edge into which a stick was inserted to serve as a handle. The quern is still used by semi-civilised peoples, and in remote parts of Ireland, the Hebrides, and the Shetlands. Down to 1874 the grindstone remained the basis of the flour-mill, but the 'power' was supplied by animal labour, by wind, and by water. Grindstones are still used here and there, for certain types of flour, in the smaller mills. They are made of *buhr*, a very hard silicate. They are from 4 to 6 ft in diameter, and their surfaces are grooved or furrowed from centre to circumference. The 'hopper' supplies the grain through the centre of the upper stone; the wheat is pushed along the grooves and broken upon the ridges.

Modern method.—In modern F. chilled iron rollers have taken the place of grindstones. The first successful steam mill was erected in London in 1784, and iron rollers were first used in 1840, following their introduction in Budapest. Hungary became the world centre for F. on account of this improvement. Minneapolis soon adopted it, becoming the most important F. centre in the world; she remains one of the most important centres to-day. From 1880 the system of roller-milling has been in operation in all large mills. As a source of motive power, steam has largely been replaced by electricity.

The first operation consists in breaking open the grain to expose the contents attached to the outer skin (bran). That this may be successfully done, that is, without particles of bran becoming incorporated with the flour, the grain is 'tempered' (damped) after being thoroughly cleaned in a series of cleaning and sieving operations. Then it is passed through sev. pairs of fluted rollers, each pair having finer flutes than the last as well as a different angle of fluting and a different rate of movement. Two products mainly result: bran, and 'middlings' or 'semolina'; a certain amount of flour is also unavoidably made at this stage and this is blended with the final flour. Next the semolina is 'purified,' i.e. the finer and coarser particles are separated, and any 'offal' or extraneous particles of tissue and fibre carried off by means of air currents. Flour-making proper is the object of the next operation. The semolina is passed through various pairs of smooth reduction rollers and 'flour' results. The flour is further treated in a 'dresser,' or revolving cylinder covered with fine Swiss silk, so as to remove any minute fragments of bran still present. The product alone which is able to pass through the meshes (12,100 to the sq. in.) is accepted as flour. The by-products of F., namely the bran and offals, are widely used by farmers for animal feeding stuffs

in the production of milk, bacon, and eggs. See R. Bennett and J. Elton, *History of Corn Milling*, 1898.

Flourens, Marie Jean Pierre (1794–1867), Fr. physiologist, b. Maureilhac, Hérault. He began his career by assisting Cuvier in 1828, and later received an appointment at the Jardin du Roi. He afterwards held a professorship at the Collège de France, became perpetual secretary of the Académie des Sciences, and in 1840 a member of the Fr. Academy. He made important discoveries relating parts of the brain and the body functions controlled by them. F. showed that the cerebrum is the organ of thought and the cerebellum the organ controlling co-ordination of body movements and will-power. He was first to show that chloroform had an anaesthetic value similar to ether. F. wrote many books on physiology, among them *Recherches expérimentales sur les propriétés et les fonctions du système nerveux, dans les animaux vertébrés*, 1824.

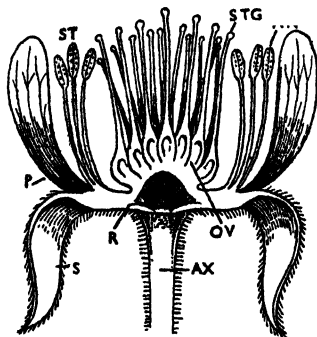
Flourish, literally a fanfare (q.v.), or, in Shakespeare's Eng., a tucket or sennet, but in modern musical terminology a short figure used as an embellishment rather than as a theme.

Flower, Robin Ernest William (1881–1946), scholar and poet, b. Meanwood, Yorks. Educ. at Leeds Grammar School and Oxford, he joined the staff of the Brit. Museum in 1906, and from 1929 to 1944 was deputy keeper of manuscripts there. He learned Irish, became an authority on Gaelic literature, and was appointed honorary lecturer in Celtic at Univ. College, London. He also at different times held lecturing appointments with the Brit. Academy, the Royal Society of Literature, and various Amer. univs. His vols. of verse include *Éire*, 1910, *Hymeneæ*, 1918, *Monkey Music*, 1925, *The Pilgrim's Way*, 1927, *Poems and Translations*, 1931, and *The Western Island*, 1944. He also trans. Tomás O'Crohan's *The Islandman*, 1929, from the Irish.

Flower, Sir William Henry (1831–99), anatomist and zoologist, b. Stratford-on-Avon. He held the curatorship of the Hunterian Museum of the Royal College of Surgeons in 1861; and, in 1884, the directorship of the Brit. Museum of Natural Hist. He wrote *An Introduction to the Osteology of the Mammalia*, 1870, *Fashion in Deformity as illustrated in the Customs of Barbarous and Civilised Races*, 1881, *The Horse*, 1891, and *Essays on Museums and other subjects connected with Natural History*, 1898. Knighted 1892.

Flower, shoot bearing a number of leaves modified for the purpose of reproduction. A typical F. consists of 4 distinct parts; the gynoecium or pistil of carpels, the androecium of stamens, the corolla of petals, and the calyx of sepals, but there are many and varied modifications from this type. The pistil and the stamens are the essential organs of a plant, because seeds cannot be formed if these are absent. When sepals and petals are indistinguishable from one

another, as in daffodil and many monocotyledons, etc., a perianth occurs. In dicotyledons the calyx, when present, is usually green as in primrose, and of a protective nature, but it may be yellow as in marsh marigold, or blue as in larkspur. The corolla is usually brightly coloured, or white; sometimes it is absent altogether, as in *Thalictrum*, the rue. A typical stamen consists of a stalk, or filament, bearing a terminal anther which contains the pollen. The pollen is the male element in the sexual process. The pistil is the female organ and consists usually of 3 parts, the ovary or seed bag, made up of carpels, above which is a shaft-like tube, the style, at the apex of which is the stigma, the receptive organ



DIAGRAMMATIC REPRESENTATION OF THE STRUCTURE OF A FLOWER

AX, axis; R, receptacle; S, sepal; P, petal; ST, stamen; AN, anther; OV, ovary; STG, stigma.

for the pollen grains. A F. is said to be complete when both calyx and corolla are present; it is incomplete if one or both of these envelopes are absent. If both stamens and pistil occur together, the F. is said to be perfect or hermaphrodite; it is imperfect or unisexual when only one class of essential organs is present, and the F.s are then either staminate (male) or pistillate (female). Where the floral leaves in each whorl are similar in size and shape, the F. can be divided symmetrically in sev. directions, and is said to be regular, as in buttercups; otherwise it is irregular, as in peas, orchids, etc. Much of the classification of plants is based upon the characters of the F., thus dicotyledons are subdivided into polypetalae and gamopetalae. The F.s of the former have petals free from one another, as in buttercup; those of the latter have their petals joined to one another, so forming a tube, cylinder, etc., as in primrose. In dicotyledonous plants the parts of the F. are usually in fours or fives of their multiples; thus a primrose has 5 sepals, 5 petals, 5 stamens, and a pistil made up of 5 carpels;

members of the pink genus (*Dianthus*) usually have 10 stamens. Monocotyledons, on the other hand, have their parts in threes or multiples; thus in the lily there are 6 perianth leaves, 6 stamens, and 3 carpels. Mention must be made of the receptacle, a very important structure in the classification of flowering plants, as upon it depends the insertion, as it is called, of the floral leaves. Thus if sepals, petals, stamens, and carpels spring one beneath the other from a more or less conical receptacle, such as occurs in the buttercup, the F. is said to be hypogynous and the ovary is superior. It is perigynous when the stamens spring from the same level as the ovary, as in rose, blackberry, etc.; and it is epigynous when the petals and stamens are inserted above the ovary, as in the lily, and members of Umbelliferae and others; in this case the ovary is said to be inferior.

For a F. to produce seed, fertilisation by pollination is necessary. Pollination is the depositing of pollen on the stigma of the pistil, and there are many devices in plants to effect this end. The 2 chief ways are by the agency of insects, and sometimes by birds, and by wind. Insect-pollinated or entomophilous plants attract either by their colour or smell or both, and the insect visits the F. for pollen or honey, incidentally causing the pollen of one F. to fall or brush on the stigma of another. The ways in which certain F.s are specially adapted for visits from certain insects, and the relative positions of stamens and pistil so as to be used to the best advantage, is a subject in itself. F.s which open in the evening are usually of a pale colour and have a strong smell—they are pollinated by moths and evening insects. Wind-pollinated or anemophilous plants often bloom before the leaves are developed, their F.s are usually inconspicuous, they produce no honey, they have no smell, and pollen is produced in large quantities; grasses and many trees belong to this type. Experiment has shown that cross-fertilisation, i.e. when the pollen of one F. unites with the ovules of another F., whether on the same or on a different plant (but always of the same genus), is more beneficial than self-fertilisation, but often if cross-pollination does not take place, the plant becomes self-pollinated. In some cases, however, self-pollination is impossible, for various reasons: (1) The anthers and stigma are in such relative positions to one another that pollen cannot possibly reach the stigma of the same F., e.g. aristolochia. (2) The stigma and anthers of the same F. mature at different times; F.s in which this occurs are either protandrous, when the anthers are first developed and have already shed their pollen when the stigma of the same F. is capable of receiving it; or they are protogynous, when the stigma is withered before the pollen is shed; this is the more uncommon of the 2 forms, but occurs in arum and in the figwort, etc. Most composites, campanulas, etc., are protandrous. (3) When the F.s are unisexual, as in willow, etc. When pollination

has once been effected, the pollen grain germinates on the stigma and sends out a tube which forces it way down the style until it reaches the micropyle of an ovule. The contents of the pollen grain then travel down the tube and fuse with the contents of the ovule. This act of fusion is fertilisation, the most direct result of which is the development of the embryo, and the conversion of ovule into seed. See also BOTANY. See K. T. Hinkson and F. Maitland, *A Book of Flowers*, 1909; W. O. James and A. R. Clapham, *Biology of Flowers*, 1935; W. J. Stokoe, *Observer's Book of British Wild Flowers*, 1937; and M. Hadfield, *Everyman's Wild Flowers and Trees*, 1938; M. C. Carey and Dorothy Fitchew, *Wild Flowers at a Glance*, 1949.

Flower Decoration. The arrangement of F.s for interior adornment has achieved a high degree of popularity at the present time. This may be due in part to the diminution of numbers of individual craftsmen and an era of mass production coinciding with the ever-growing consciousness of the importance of the décor of the home. In this unlearned era it is a means of self-expression involving less time than the more recognised arts. Personality and individual tastes can be expressed through the medium of F.s, and a high degree of beauty is to be achieved by the considered use of simple materials.

While the tradition of gardening in England is an old one, the arrangement of F.s in vases is less so. It is interesting, however, to find that there are pictures that indicate that F.s were arranged in vases even as early as the middle of the 16th cent.; there is, for example, a painting of the family of Sir Thomas More by Holbein around 1530, showing charming vases of F.s. Appreciation of their beauty and scent caused them to be used over the centuries in a different way; one reads of them being strewn on floors, tables, and beds, to give a fleeting pleasure. Eng. D. is influenced naturally by background lavishness of material and climate, while the richness and gaiety shown in the F. paintings of the early Dutch, Flem., and Fr. artists have certainly contributed to our tradition.

The Oriental tradition of F. arrangement is an ancient inheritance and seems to be closely linked with the philosophy of the country from which it derives. That of China is extremely ancient and reflects in its gentle, almost casual, nature some of the qualities of the people. Jap. F. arrangement derived from the Chinese goes back over a thousand years and again is influenced by racial characteristics, showing a precise, stylised, and, perhaps, more self-conscious art, an art designed in its earlier times for the temple rather than the home.

It would seem probable that the best and most suitable D.s with F.s are achieved when the characteristics of a race are allowed full sway, and a too rigid attempt to copy faithfully the truly beautiful Oriental work could lead to a form of adornment not entirely sym-

pathetic to the Eng. home. Nevertheless there is much to learn from illustrations of the Oriental art, of line and of management of mass. The prevalent interest, the study of the work of other countries through pictures, books, and exhibitions has brought about increased understanding of the whole subject, and in particular of the suitable treatment, care, and use of a great range of decorative material. In Victorian days F.s were not so freely to be bought in the cities as they are now. Those who possessed greenhouses and gardens used their F.s somewhat conventionally, while from the cottage gardens came the precise, formal bunches which we think of in connection with that age. There are also the more romantic associations of moss roses and forget-me-nots, lily of the valley, and white roses, and such like. During the Edwardian era F.s began to be more freely used both as to quantity and method of arrangement, although stereotyped ideas still prevailed.

Now, with wider horizons, the palette of the painter of F.s is greatly extended and all kinds of materials come under review. With this new consciousness there is consideration now for the suitability of vases in relation to F. and to background and no longer are we satisfied with a range of restricted, conventional vases. From sculptured containers of stone, marble, lead, and bronze such as are depicted in the grander paintings, through delicate china and domestic objects both rich and homely, our choice is now made. F.s are chosen to emphasize some special quality of the room which they are to adorn; they may be used to reflect the colour of pictures or hangings, to emphasize dignity or homely simplicity. Increased appreciation of F.s in D. has led to a study of their care; they die as a result of transpiration and all that is possible to do to enable them to withstand the dry air of living rooms is now borne in mind. A preliminary sojourn for hrs in deep water, the crushing or splitting of stem tips, the removal of superfluous growth, leaves, for example, that will come below the waterline of the vase, the reduction of over-heavy foliage, the reviving powers of warm water, all are discussed in current textbooks. In these are also to be found advice concerning the mechanics of F. arrangement, the means whereby F.s, leaves, heavy branches of berries and fruit may be held securely in place, the range of possible material, and the preservation of seed heads and F.s for winter use. See Constance Spry, *Floral Decoration*, 1953, and *How to Do the Flowers*, 1954, etc.; Julia S. Berrall, *A History of Flower Arrangement*, 1953.

Flower-de-luce, see FLEUR-DE-LIS; IRIS.
Flower Gardens have from earliest times been cultivated for pleasure and profit. Especially in the E., where the confinement of a building is so oppressive, we have records of G. of surpassing beauty. The first mention of them is the description of Solomon's G., which were, however, overshadowed by the hanging G. of

Babylon, one of the seven wonders of the world. They were irrigated by water from the Euphrates, and contained a wonderful variety of effects. Persian G. supplied the type which the Gk. gardeners followed. Coming to comparatively modern G., the Fr. style is one of characteristic elegance. Le Nôtre (q.v.) obtained fame in the reign of Louis XIV by laying out the G. of Versailles. In 1742 Richard, Viscount Ranelagh, threw open the fine G. which he had built to his mansion at Ranelagh, and they remained a favourite public resort till 1803. In 1861 Vauxhall G. also became famous. Landscape gardening reaches a state of highest perfection in Japan, where they attain the most successful results by following a picturesque irregularity. F. G. have always been a source of pleasure to Eng. people. Bacon's essay 'Of Gardens' is a fine description of one of the Elizabethan period. As in other things, garden flowers have their period of popularity and change for newer varieties, and the foxglove, lavender, marigold, lobelia, calceolaria, and pansy are superseded by geranium, hyacinth, tulip, and chrysanthemum. See also GARDEN ART.

See T. Hammer, *The Garden Book*, 1659; F. Watson, *Flowers and Gardens*, 1901; E. S. Rohde, *Scented Garden*, 1931, and *Gardens of Delight*, 1934; M. Hadfield (ed.), *The Gardener's Companion*, 1936; and S. B. Whitehead, *In Your Flower Garden*, 1948.

Flower Painting. In Europe figure-P. has always been the form of art most studied, nature study being a late development. F.s., although used often in a conventionalised form to decorate illuminated MSS. (see ILLUMINATION or MSS.), did not themselves form the subject of pictures in the earlier centuries of the Christian era. In the 17th and 18th cents. the Dutch and Flem. painters developed the art of F. P. to a high degree. Jan Brueghel (1568-1625), the subject painter, exquisitely reproduced living F.s. Frans Snyder (1579-1657) frequently collaborated with Rubens by supplying the still life in the master's paintings. Very delicate in his treatment of blossoms was Jan Davidz de Heem (1606-83), whose son Cornelius inherited his father's gift to a lesser degree. Daniel Seghers (1590-1661) was a noted painter of F.s., refusing to blend his subject with any other forms of still life; others are Willem van Aelst (1626-79), and Jan van Huysum (1682-1749). Among the Fr. artists F. P. became an important study in the 19th cent. Henri Fantin-Latour (1836-1904) was a master of this delicate art. From the time of the Impressionists, however, it has tended to become a study of light or colour rather than botanical form, as in 'A Vase of Roses' by Edouard Manet (1832-83), 'Nymphéas' by Claude Monet (1840-1926), or 'Sunflowers' by Vincent van Gogh (1853-90). In the E. it has been a cult for many centuries. 'Before a masterpiece of Fantin-Latour we feel that the flowers have been taken

from a field or garden to be grouped before us, a feast for the eye,' says Laurence Binyon in *Painting in the Far East*, 'but the Chinese artist brings us to the flower, that we may contemplate it and take from it into our souls something of the beauty of life which neither sows nor spins.' The plum blossom and lotus F. provided a sufficient theme for the Oriental artists without need of human figures, and among the most famous F. painters of the Sung period are Hsu Hsi (10th cent.), Chao Ch'ang (11th cent.), and Li Ti (12th cent.). See CHINA, *Chinese Art*. See E. Haig, *Floral Symbolism of the Great Masters*, 1916; T. W. Rarp, *Flower Painting*, 1928; and I. Nishikawa, *Floral Art in Japan*, 1936.

Flower Shows were first sponsored by the Royal Horticultural Society of London, which was founded by Thomas Andrew Knight in 1804 and received its first charter in 1809. The object of the society is to encourage and promote the cultivation of plants, F.s., fruits, and vegetables, and to provide horticultural instruction, education, and scientific demonstration. To this end the society has experimental gardens, formerly at Chiswick, now at Wisley, Surrey, and sponsors practical demonstrations and S. throughout the year. The most important F. S. held in London are the Chelsea Flower Show, held in spring each year, and the Great Autumn Show, held in Sept. In addition, fortnightly S. are held throughout the year, in the R.H.S. New Hall, Greycoat Street, or the Old Hall, Vincent Square, London, S.W.1, of F.s., fruits, vegetables, shrubs, and trees appropriate to the season. Under the auspices of their societies, special F. S. are also held during the year: Brit. Iris Society's Show in June; National Rose Society's Show, late June; Brit. Delphinium Society's Show, early July; National Sweet Pea Society's Show, July; Brit. National Carnation Society's Show, July; Brit. Gladiolus Society's Show, early Aug.; National Dahlia Society's Show, Sept.; National Rose Society's Show, mid-Sept.; National Chrysanthemum Society's Show, late Sept. and Nov.; and S. are held under the Alpine Society, the Geranium Society, the Cactus and Succulent Society, etc. Important prov. F. S. are held at Birmingham, Shrewsbury, Southport, Harrogate, etc., while most towns and vills. throughout Britain sponsor local F. S. in summer. F. S. are promoted in many cities by certain newspapers. In Scotland, the Royal Caledonian Horticultural Society, founded in 1809, holds April and Sept. F. S. in Edinburgh. See HORTICULTURAL SOCIETIES. See *Royal Horticultural Society's Gardener's Pocket Diary and Note Book* (ann.).

Flower Wines, see WINES, HOME-MADE.

Flowering Ferns, see OSMUNDA.

Flowering Plants, see GARDENING.

Flowers, in chem., substances which are sublimated as the result of physical or chemical action. The chief are F. of sulphur, the fine powder which is obtained

when crude sulphur is heated to vaporisation and condensed in a cooling chamber; F. of phosphorus, a flocculent powder consisting of phosphorus pentoxide, formed when phosphorus is burned in excess of air or oxygen; F. of tin (*flores stannæ*), a mixture of powdered metal and stannic oxide formed by fusing the metal in excess of air; F. of zinc, antimony, arsenic, etc.

Flowers, Artificial, imitations of natural F. used for various purposes of ornamentation, including millinery, dresses, and decorations in the house. The Fr. make most of these A. F., though some are made in England and other countries. The materials most commonly employed are sarcenet, cambric, velvet, gauze, threads, and wire, and in some cases paper. The petals and sepals are first stamped out and then gaufered, the same process being pursued with regard to the leaves, which are made of green taffeta, the stems being made of wire. The F. made for tombs are of pottery or enamelled iron, and sometimes of wax. The Chinese make A. F. from rice-paper, and in the Bahama Is. they are made of shells. Plastics are also used for this purpose.

Flowers, Florists', are plants with horticultural varieties, whose parent species are unknown or not cultivated, as the dahlia or gladiolus. Dahlias have only been introduced into England in comparatively modern times, but their beautiful colours, and the fact that they are easily grown and require no especially rich soil, has made them very popular. *Gladiolus*, a genus of the order Iridaceæ, bears brilliant F., blossoming in midsummer. In America F. F. is the term applied to any F. raised to be cut for ornamental purposes, as rose, carnation, violet. They are brought to a high state of perfection and elaborate estab. are maintained for their rearing, transportation, and disposal, giving employment to thousands of people, the increase of wealth in the cities being responsible for their demand.

Flowers, Language of. F. have been used from remote times as symbols of specific ideas and sentiments; their use as a sort of sign L., adopted in the E. and well known to the anc. Greeks and Romans, was revived in medieval Europe during the age of chivalry. In modern times many F. have a significance which is universally accepted; the rose is the emblem of beauty or love, the lily of purity, the violet of modesty, the daisy of innocence. But the L. of F. even extends to definite messages. Thus the gift of a garden daisy means 'I share your sentiments'; a Michaelmas daisy means 'Farewell'; peach blossom, 'I am your captive.' Meanings may also be varied with a single flower; a rosebud having its leaves, but with thorns removed, conveys the message 'I fear but I hope'; if the leaves also are removed it means 'There is everything to fear'; while a full-blown rose placed over 2 buds signifies secrecy. See John Ingram, *Flora Symbolica*, 1875; *The Language of*

Flowers, an Alphabet of Floral Emblems, 1875; *The Language of Flowers*, 1902.

Flowerly, see FLEURY.

Fludd (Flud, or Flaid), Robert (1574-1637), physician, Rosicrucian (q.v.), and mystic philosopher, of Kent. He entered St John's College, Oxford, 1591, then spent 5 years studying on the Continent, taking his medical degree at Oxford, 1605. He was a follower of Paracelsus, and tried to form a philosophic system based on his teachings. F. was author of many obscure Lat. works, theosophical, philosophical, and mathematical. His works include: *Apologia Compendiaria Fraternalitatem de Rosæ Cruce Affuens*, 1616, *Veritatis Proscenium* (a reply to Kepler), 1621, *Philosophia Sacra et Vere Christiana*, 1629, *Summum Bonorum* (reply to Mersenne), 1629, *Dr Fludd's Answer unto M. Foster . . .*, 1631, *Integrum Morborum Mysterium*, 1631, *Clavis Philosophiæ et Alchymiciæ Fluddianæ*, 1633, and *Philosophia Moysaica*, 1638 (Eng. ed.), 1659. See J. Webster, *Displaying of Supposed Witchcraft*, 1677; A. Waite, *The Real History of the Rosicrucians*, 1887; J. B. Craven, *Doctor Robert Fludd, the English Rosicrucian*, 1902; and D. Saurat, *Milton et le matérialisme chrétien en Angleterre*, 2nd ed., 1944.

Flügel, Otto (1842-1921), Ger. philosopher, b. Lutzen, son of the burgo-master. Pastor at Wansleben, 1871. Co-editor, *Zeitschrift für exacte Philosophie*, from 1873; of *Zeitschrift für Philosophie und Pädagogik*, from 1894. After Kehrbach's death F. took over the editorship of Herbart's works. His own writings include *Materialismus*, 1865, *Die Bedeutung der Metaphysik Herbarts*, 1902, and *Herbarts Leben und Lehre*, 1907.

Fluid, name given generally to substances devoid of rigidity. Gases and liquids (qq.v.) are included in the term, since these bodies offer no sensible resistance to change of form, though they resist compression. Thus when a F. is acted upon by any distorting combination of forces it *flows*, so long as the rate of shear is not too great. Hydrodynamics is the name of the branch of applied mathematics which deals with the motion and equilibrium of F.s. The word F. is figuratively applied to things which are not in reality such. For example, we speak of electric F. in the sense of electricity, whose general properties and motions are known to conform to certain differential equations which the motions and properties of true F.s strongly suggest. Nowadays, however, most scientists avoid this figurative use of the word as far as possible, for it dates from the time when electricity, magnetism, etc., were actually believed to be due to F.s, which were supposed to have a real objective existence. All F.s are elastic, but liquids are highly incompressible, whereas gases can be easily compressed. There is more or less frictional resistance to the molecular motions in every F. It is somewhat difficult to draw a sharp distinction between the solid and the liquid state. Some substances, when exposed to long

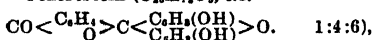
continued gentle stress, flow like visco-liquids, whereas they would splinter if subjected to sudden intense stress.

Fluid Measure, see METROLOGY.

Fluke, see LIVER-FLUKE; TREMATODES.

Fluoboric Acid Gas, pungent, soluble gas obtained by heating a mixture of boron trioxide and fluorspar with concentrated sulphuric acid. It does not attack glass, but has a great affinity for water and rapidly chars many organic substances. It combines readily with ammonia gas, forming various compounds according to the relative proportions of the 2 gases.

Fluorescein ($C_{20}H_{12}O_6$), i.e.



a chemical product or dye obtained by heating phthalic anhydride with resorcin at 200° till the mass becomes viscid. It is a reddish or yellow-brown powder, dissolving in water or an alkali to form a solution with a beautiful green fluorescence. It is little used itself for dyeing purposes, as the colours are not fast, but eosins are derived from it, and rival safflower and saffronin for rose-red dyes. See DYE; PHTHALIC ACID.

Fluorescence, optical property possessed by certain substances whereby light of one colour is absorbed and light of another colour is emitted. The word is also used to describe the emission of light from a substance as a result of the excitation of that substance by X-rays or electrons. It is usual to limit the term F. to the emission of light within 10^{-8} sec. of the absorption of the incident energy. For longer periods of delay the process is termed *phosphorescence* (q.v.). When light falls on sulphate of quinine, for example, the liquid exhibits a bluish colour, which is continued some distance below the surface. The light which passes through the liquid is incapable of producing the same effect on another quantity of the substance, so that it appears that light of certain qualities, i.e. frequencies, has been absorbed to produce the F. The phenomenon was first described by Sir D. Brewster in 1833, was investigated by Sir John Herschel, and later by Sir G. G. Stokes. If a beam of sunlight is focused on a solution of quinine sulphate by means of a lens of long focus, a blue cone of light is formed and can be plainly followed by the eye through the liquid, though the intensity of the light rapidly diminishes as it recedes from the surface. In order to discover what rays are responsible for the blue light, a test-tube containing quinine sulphate may be passed through the different parts of the spectrum. No change is observed when the tube is held in the red, orange, and yellow, that is, in the less refrangible rays, but as it approaches the violet, rays of a blue colour proceed, and this continues beyond the visible spectrum into the ultra-violet rays. The general effect then is that light waves of short-wave length are absorbed and waves of longer wave length are emitted. On the quantum theory

(q.v.) this would be expressed as the absorption of a quantum of a certain energy and the emission of one of lower energy. Among fluorescent substances may be mentioned fluorspar, chlorophyll, aesculin, uranium glass, tincture of turmeric, paraffin oil, barium platino-cyanide, magnesium platino-cyanide, fluorescein, and various sulphides. The phenomenon of F. is now put to use in electric discharge lamps. The electric current in the discharge tube produces ultra-violet radiation and when this falls on a coating of a fluorescent material deposited on the wall of the tube light of the visible spectrum is emitted. See LUMINESCENCE; PHOSPHORESCENCE. See Sir G. G. Stokes, *Mathematical and Physical Papers* (vols. iii and iv), 1880-1905; J. A. Radley and J. Grant, *Fluorescent Analysis in Ultra-Violet Light*, 1933; R. W. Wood, *Physical Optics*, 1934.

Fluorescent Lighting, see LIGHTING, *Artificial lighting*.

Fluorescent Paint, see LUMINOUS PAINT.

Fluorescent Whitening Agents, see BLEACHING.

Fluoric Acid, see HYDROFLUORIC ACID.

Fluorine, chemical element of the halogen group, atomic weight 19, atomic number 9. It is an extremely active gas, combining readily with most chemical elements. It was isolated in 1886 by Moissan, who obtained it by electrolysis of potassium fluoride in liquid hydrofluoric acid free from water. As anhydrous hydrofluoric acid is itself a non-conductor of electricity, the addition of a quantity of potassium hydrogen fluoride was necessary to convey the current. The electrolysis was carried out in a U-tube made of an alloy of iridium and platinum, this substance being less readily acted upon than other metals. The electrodes were made of the same material, and the products of electrolysis were carried off by lateral tubes, the entrances to the U-tube being stoppered with fluorspar. As an additional precaution a temp. of -23° C. was maintained during the operation, this being done by surrounding the tubes by the vapour from boiling methyl chloride. The object of this cooling is to condense any hydrofluoric acid gas present. F. is now prepared on a large scale by the electrolysis of fused potassium hydrogen fluoride in an electrically heated copper V-tube with graphite electrodes. F. is a pale yellow gas with an irritating smell. It condenses at -187° C. to a yellow liquid, and forms a light yellow solid at -233° C., whilst at -252° C. it becomes white. It is the most active element known, decomposing water readily, and liberating appreciable quantities of ozone. It combines violently with non-metals such as bromine, iodine, carbon, sulphur, silicon, phosphorus, arsenic, etc., frequently causing them to burn with incandescence; it readily attacks mercury, sodium, potassium, magnesium, and other metals, and is only unaffected by oxygen, nitrogen, and chlorine. Curiously enough the gas can be kept over mercury if it is

not shaken, but this is due to the formation of a layer of fluoride which protects the metal from further attack. The only compound of F. with hydrogen is *hydrofluoric acid*, prepared commercially by heating fluorspar with sulphuric acid in leaden vessels. It is a colourless liquid boiling at 19°C .; its vapour is extremely poisonous, and it combines readily with many metals, forming fluorides. Its most useful property is that demonstrated by its action on glass; it attacks the silica, and may thus be used for etching glass. When the materials are dry, no action takes place. F. is found in nature in fluorspar (CaF_2), cryolite, and other minerals, and traces are found in sea-water and in the enamel of teeth. Various compounds of F. have recently become of considerable industrial importance, and many of them are of high significance in atomic energy operations.

Fluorspar, or **Fluorite**, mineral mainly consisting of calcium fluoride (CaF_2). It occurs crystallised in the cubic system and in the massive form. The crystals have a perfect cleavage, a hardness of 4, sp. gr. 3.2, and occur in a wide range of colours from transparent to almost black. It often contains calcium chloride and traces of organic matter. Many crystals contain an internal cavity, which is found to contain liquid or gas. The colour, too, is attributed to organic matter, as when the mineral is heated the colour tends to disappear and small quantities of carbon monoxide, hydrogen, etc., are evolved. Some varieties exhibit the phenomenon of fluorescence (q.v.), and phosphorescence is observed when the mineral is submitted to Röntgen rays. F. occurs in association with ores of tin, lead, copper, and silver, and also in cavities in volcanic rocks. It is of wide distribution, and is common in England, particularly in Cornwall, Devon, Derbyshire, and Cumberland. In mining dists. F. is used as a flux for copper, lead, and gold ores. The violet variety, known as 'Blue John' in Derbyshire, is made into ornaments. The mineral was highly prized by the ancients for this purpose, but the spar is too soft for personal ornaments. F. is the chief source in the manuf. of commercial hydrofluoric acid, used for etching glass. The transparent variety is used in the construction of optical instruments.

Flushing (Dutch *Viissingen*), seaport and holiday resort in the prov. of Zeeland, Netherlands, on the S. coast of the is. of Walcheren, at the mouth of the W. Scheldt. It was once an important naval station and a fortress, but is now a leading port of commerce, carrying on, in normal times, an extensive trade with England and South America. The tn has grown in favour as a summer resort. It has a royal dockyard, and since 1875 a large floating dock. The chief industries are shipbuilding, brewing, and the manuf. of oil and soap. Exports agric. produce and shrimps. In the Second World War the greater part of F. was captured on 1 Nov. 1944 by a strong force of Brit. commandos who were landed on Wal-

cheren. Pop. (1954) 26,620. *See also* WESTERN FRONT IN SECOND WORLD WAR.

Flushing and Flushing Bay, once a vil. of Queens co., New York, U.S.A., but since 1897 has been part of the bor. of Queens, New York city. It is situated on Long Is., at the head of F. B., and is named after early Nonconformist settlers from F. in Holland. It is the seat of Queens College of the City of New York.

Flute, musical wind instrument consisting of a long tube of wood or sometimes metal, in sev. detachable joints and open

at the lower end. The vibration of the air in the tube is caused by blowing into the upper end through an oval-shaped hole in the side. There is no mouthpiece, as in other wind instruments. The different intervals in the pitch are obtained by closing or opening the different finger-holes in the lower part of the tube, by which the vibrating column of air is lengthened or shortened as required. The F. in general use possesses a workable compass of about 3 octaves from the low C in the treble clef with all the chromatic intervals. There are 6 finger-holes in the lower part of the tube arranged at fixed intervals from each other in order to produce all the notes which form a major scale; the 2nd octave is obtained by overblowing, which raises each note to an octave higher, and the 3rd octave can be added by a system of cross-fingering. For chromatic intervals the instrument must have additional finger-holes which are manipulated by means of keys. Cocus-wood is the material from which the majority of F.s are constructed, but gold, silver, and other metals are sometimes used. Ebonite also is used. The F. has been in use from the earliest times. Olympus the Phrygian has been credited with the introduction of F.-playing into Greece, where it was largely used in religious ceremonies and encouraged by means of competitive trials; but the ancient F.s were blown vertically, like the old Eng. recorder and the Fr. *flûte à bec*, so called from its supposed resemblance to the beak of a bird. (See RECORDER.) The 'German' F. (*flauto traverso*) gradually superseded the *flûte à bec* from its invention about 1720. Handel



MODERN
CONCERT
FLUTE

was one of the earliest composers to introduce the 'German' F. into the orchestra, employing it for some of the solos in *The Ode on St Cecilia's Day*, 1739. The F. of Handel's day, however, owing to the arrangement of the finger-holes and the

difficulty of manipulating the fingering, could be played in tune only in certain keys; this difficulty was abolished by Boehm about 1834, when he introduced the cylindrical bore in place of the old conical bore and a new system of fingering. F. solos are less common than they were formerly, but the instrument still plays an important part in orchestras, where the F. part is generally placed at the top of the score and is written in the violin or G clef. Other varieties of the F. are the *fife*, simply an octave F. in B \flat , much used in military bands; the *flageolet*, a smaller variety of the old *flûte à bec*; the *piccolo*, an octave F.; and the *flûte d'amour*, a minor 3rd below the ordinary F. Among the foundation stops of most organs there are generally one or more 'F.' stops. See also FIFE, PICCOLO, RECORDER. See R. S. Rookstro, *The Flute* (new ed.), 1928; H. M. Fitzgibbon, *The Story of the Flute*, 1928.

Flute-stop, organ stop of the diapason species and so called because its tone resembles closely that of a flute. The bell diapason, as it is often called in Britain, is the *flûte à pavillon*, a stop of Fr. invention, and is characterised by its peculiarly powerful tone.

Fluting, in architecture, a concave channel cut vertically on the surface of the shaft of a column or on a pilaster. In Doric columns the flutes round the shaft are 20 in number and meet with a sharp edge. They are carried up above the necking and end abruptly at the base of the cap. In the other Orders, the flutes are 24 in number, and are separated one from the other by small fillets. Sometimes the flutes are cabled, that is to say, they are filled in with a bead for about a 3rd of the length of the shaft from the base. See ORDERS OF ARCHITECTURE.

Flux (from Lat. *fluere*, to flow), substance used to aid in separating metals from the other constituents of their ores. The action may be either the removal of silica or other earthy matter by promoting fusion, or actual combination with the oxygen, sulphur, etc., in the compound from which the pure metal is to be extracted. Black F. is a reducing F., that is, it extracts oxygen from the ore. It consists of a mixture of finely divided carbon and potassium carbonate, and is made by heating crude cream of tartar with about half its weight of nitre. White F. is a mixture of carbonates of soda and potash. Other F.s are lime, borax, silica, calcium sulphate, fluorspar, and red lead.

Fluxions, method of mathematical computation devised by Sir Isaac Newton. The method was used by Newton for some time before he disclosed its principles to the world in 1693. For some years the system was used by Eng. mathematicians, but was gradually abandoned in favour of Leibnitz's notation. Leibnitz looked upon quantities as made up of very small parts, as the circumference of a circle may be represented as a polygon of an infinite number of sides. Newton, on the other hand, represented a linear quantity as the effect of the continuous motion of a point

the velocity of which in equal intervals of time measures the magnitude of the quantity. The method of F. was fully treated in the *Treatise on Fluxions* of Colin Maclaurin, pub. in 1742. The method of F. is a primitive form of the present-day calculus (q.v.).

Fly, see DIPTERA; HOUSE FLY.

Fly, Artificial, see ANGLING.

Fly-biister, see CANTHARIDAE.

Fly-catcher, a bird of the passerine family Muscipapidae, but it is used in a wider sense generally to describe all birds who catch flies on the wing. There are over 40 genera and 280 species. The F.s are small-sized, bright-plumaged birds, and abound in warmer parts of the old world and in Australia. They are not found at all in North and South America. The bill is a distinctive feature; it is strong and short, and has bristles on the broad, flat base. The common Brit. F., *Muscipapa grisola*, is a tiny brownish-grey bird. The pied F. (*Muscipapilla atricapilla*) is a native of Great Britain, rare in the S., not uncommon in the N. The beautiful paradise F. of the East Indies and the 'grinder' of Australia do not belong to the family Muscipapidae.

Fly-fishing is the sport of catching fish by use of an artificial fly as bait. It is rightly considered to be the most fascinating branch of angling, and great ingenuity has been bestowed upon the manuf. of the various flies used for the purpose. Not only has the angler to choose a fly closely resembling in colour and shape the flies dancing over the stream at the time, but he must also cast the bait in such a way as to preserve the appearance of life. F. is principally used for the salmon, trout, and grayling. Sometimes 3 or 4 flies are cast together upon the water and drawn below the surface somewhat at random, while another method is to select a particular fish and cast a fly a short distance up-stream, allowing it to float down over the fish's head. The sport requires considerable dexterity and has innumerable devotees. See bibliography for ANGLING.

Fly River, New Guinea, rising in the NW. corner of the Brit. part of the is., and flowing into the Gulf of Papua by a wide delta. Macfarlane and d'Albertyis ascended it 90 m. in 1875, and in 1885 Capt. Everill explored it for 200 m. It is navigable for 500 m. of its 650 m. course. Its banks are densely wooded.

Fly-trap, see DIONAEA MUSCIPULA.

Fly-wheel, wheel of large diameter and heavy rim connected with the driving-shaft of an engine in order to equalise the motion. Where the motion of an engine proceeds from the to-and-fro movement of a piston-rod it is evident that the velocity decreases towards the end of the stroke. The moving parts of the engine thus tend to proceed in jerks. The function of a F. is to receive the excess of energy when the impulse is great, thus retarding the motion of the engine, and to aid the engine when the impulse is less than the mean, acting as a reservoir of energy. It is used: (1) when the engine

is moved by force applied in successive strokes, as in a single-acting engine, a treadle lathe, etc.; (2) when the work which the engine is called upon to perform consists of intermittent strokes, as in punching machines, etc. For effective working the F. should be placed near the seat of intermittent motion; thus, a punching machine driven by gas should have a F. on the crank-shaft to regularise the motion of the gas engine, and another on the punching mechanism to store the energy to be given out in successive punches.

Flying, or Flight, the act of moving through the air by propulsion given by wings. In the strict sense of the term the power of flight is only possessed by certain insects, birds, and bats, the latter including the so-called F.-fox. There are other animals which modify their progression through the air by various means which give their actions a certain similarity to actual flight, and they are therefore loosely termed F. animals. It is uncertain to what extent the extinct reptiles (ptero-dactyls) were actually capable of F., but they certainly possessed wings very similar to those of the bat. The so-called F.-fish (q.v.) give themselves an initial impulse by means of a powerful spring effected by their muscular tails; and use their pectoral fins after the manner of a gliding vane, being thereby able to sustain themselves for some hundreds of ft in the air. The action of the fin, however, can hardly be said to be analogous to that of the wing in birds. Certain species of lizards, as, for example, the *Draco volans*, have a skin formation attached to their ribs, which are peculiarly elongated, in such a way as to form a kind of kite, and this enables them to make short darts through the air. The F.-opossums or F.-phalangiers, a genus of small arboreal marsupials found in Australia, have a fold of skin along the flanks which, serving as a parachute, allows them to make prolonged leaps with considerable agility and grace. A smaller member of the same species is known as the F.-mouse. There are also 2 genera of squirrels (*Pteromys* and *Sciuropterus*) which have a development of the skin between the fore and hind legs and possess the power of making leaps for great distances through the air. In doing so they also make use of their tail, the hairs of which stand out on either side and serve to some extent as feathers for supporting them, while the tail also helps to direct their flight. The parachute action exhibited by the animals mentioned above is developed to a greater extent in the F.-lemur (*Galeopithecus*), an insectivorous animal in whom the hairy fold of the skin reaches from the throat to the end of the tail and includes the whole length of both fore and hind legs up to the claws. These animals can leap a distance of over 200 ft, and are found in the Indian archipelago. Zoologically it is difficult to say whether the F.-lemurs should be classed with lemurs, bats, or insectivores, but the latter is the usual method of classification adopted. There are also

kinds of squid, known as the F.-squid, having broad lateral fins which enable them to spring high out of the water. See also BAT; BIRD; DRAGON; FLYING-FISH; INSECT; OPOSSUM; PTERODACTYL; SQUIRREL. For F. machines see articles on AERONAUTICS; AEROPLANE.

Flying Bomb, pilotless jet-propelled aircraft used by the Germans as a long-range bombardment weapon against London and other targets, both in England and on the Continent, in 1944. Its speed was between 350 and 400 m.p.h., the weight of explosives about 1 ton, and the range approximately 150 m. During the 80 days of the most intense bombardment of London between June and Aug. 1944 some 2300 of a total of 8000 F. B.s launched reached the London area; 25 per cent were erratic, many diving into the sea; a few of the others strayed as far as Norfolk and Northampton; and the remainder were brought down by the combined efforts of anti-aircraft guns, fighter pilots, and barrage balloons. In the first week of the bombardment 33 per cent were brought down, while rather more than that reached London. By the end of the 80 days 70 per cent were being brought down by the defences, and only 9 per cent reached London. In the ensuing months F. B.s were launched pick-a-back from Heinkel planes over the North Sea, but the number that reached England was negligible. In the intense period the record destruction of F. B.s was on 28 Aug., when out of 101 which approached the Eng. coast 97 were brought down by the defences. As far back as April 1943 reports from secret agents suggested that the Germans were developing a long-range bombardment weapon of a novel type. Reconnaissance aircraft obtained photographs in May showing that at Peenemünde on the Baltic coast there was a large experimental station where jet-propelled F. B.s for launching from inclined ramps fitted with rails were being tried out. Later it was seen that the Germans were building all along the Fr. coast, from Cherbourg to Calais, a series of concrete structures similar to those seen on the Baltic coast, and all the Fr. sites were seen to be oriented in the direction of London. These ramps or sites were repeatedly and successfully bombed, and then in Mar. 1944 the Germans began constructing an entirely new series of firing points, which though speedily constructed were effectively camouflaged. The Ger. attack started a few days after the Allied landings in Normandy (June). An awkward problem was that of seeing the F. B.s at all. Pilots on patrol had the greatest difficulty in spotting so small and fast-moving an object sev. thousand ft below, though over-land help was rendered by radio telephone. In darkness, however, it was easy to spot the flaming tail of the F. B. many m. away, but in order to bring down the bomb the pilot had to fire his guns at a range of 300 yds. If he fired when too far away he would probably miss the bomb; if he fired when he was too near the bomb might blow up and kill

the pilot. Meanwhile Sir Thomas Merton produced a simple and ingenious range-finder, which proved to be the complete solution for this difficulty. In July 1944 a light-scale attack was made on Portsmouth and Southampton, but most of the F. B.s fell in the sea or in open country, showing that the weapon was not accurate enough against targets of that size, and during the rest of the summer the attack was directed indiscriminately at the unique target of London, and about 92 per cent of all the fatal casualties occurred in the London region. In the summer Brit. and Amer. Air Forces dropped over 100,000 tons of bombs on the F. B. sites. Large stores of F. B.s were located in tunnels and caves near Paris, and many of these were discovered and destroyed. There is no doubt that but for timely interference the bombardment would have started early in 1944 at a time which would have seriously affected the efficiency of the defences. The only completely effective answer was to capture the sites, especially those in the Pas de Calais. The successful Allied invasion achieved that purpose, though the previous destruction of the first 100 launching sites not only delayed the bombardment, but also forced the Germans, for the sake of concealment, to construct their second series of sites on simpler and less efficient lines. It may be added that during 1944 some 24,000 houses in London were destroyed and 800,000 more or less badly damaged. F. B.s and rockets were also fired by the Germans at Antwerp and Liège in Belgium between 13 Oct. 1944 and the end of Mar. 1945. Antwerp in particular was subjected to incessant attacks, which caused much loss of life and damage, but this did not interfere with the working of the port and the moving of military supplies. See also ROCKETS.

Flying Bridge, see FERRY.

Flying Dragon, or Draco, genus of lizards, belonging to the family Agamidae. The species are brilliantly coloured and are found in Malaya; in habit they are entirely terrestrial, and in diet insecti-

vorous; their harmlessness makes them suitable for pets. Their great peculiarity lies in the wing-like membranes, which extend from their sides, can be opened and shut at their owners' will, and serve as a parachute when they leap from one branch to another. *D. volans*, a Malayan lizard, is the best-known species; in length it is about 5 in., with another 5 in. for the long, thin tail.

'**Flying Dutchman,**' name given to a spectre ship, supposed by popular belief to haunt the waters round the Cape of Good Hope. According to the legend, the captain of the vessel, Vanderdecken, was condemned for his blasphemy to sail for ever round the cape in the F. D., always unable to 'make' a port.

Sailors considered the appearance of the F. D. a bad omen and quickly changed their course to avoid it. The legend has sev. variants in many tales of Ger. mythology, and its prototype is likewise current in other countries. According to Sir Walter Scott, the vessel was originally laden with bullion, a murder was committed on board, and plague broke out. Wagner's opera, *Der fliegende Holländer*, is based on this legend.

Flying-fish, a species of bony fish belonging to the family Exocoetidae and



FLYING-FISH (*Exocoetus volitans*)

allied to the half-beaks (Hemirhamphidae), garfishes (Belontiidae), and skippers (Scombroscidae), these families together forming the order Syngnathiformes. All F.s have large plane-like pectoral fins by means of which they glide over the sea. Some species also have large pelvic fins. The mouth is small and the teeth are minute. F.s occur in the warmer parts of the ocean. See also FLYING.

Flying-fox, see FRUIT-BAT.

Flying-lemurs, or Colugos, order Dermoptera, have no close affinity with the lemurs (q.v.) but are more closely related to the insectivora. There are 2 species: *Galeopithecus volans*, found in the Philippine Is., and *Galeopterus temminckii*, ranging from Siam and Malaya to



FLYING DRAGON

Borneo. They are about the size of small domestic cat and are nocturnal and arboreal, feeding on fruits and leaves. They plane from tree to tree by means of the 'parachute' of skin (patagium) extending from the neck to the limbs and tail.

Flying Machines, see AERIAL NAVIGATION; AERODYNAMICS; AERONAUTICS; AEROPLANE; AIR FORCE; BOMBER; FIGHTER.

Flying-squirrel, member of the family Petauristidae of rodent animals, having a parachute-like expansion of the skin of the flanks, partly supported by bony processes of the feet, which enable it to take extraordinary leaps, gliding for a great distance through the air. There are 3 widely distributed genera, *Petaurista*, including the larger species, are characteristic of the Indian and East Indian region. The European species, *Sciuropterus russicus*, is about the size of a rat, of a greyish-ash colour, with a short tail, and it lives in the forests. Its fur is of little value. The North Amer. species, *Glaucomyis volans*, on the contrary, is a good deal larger, and its tail is as long as its whole body. In general appearance F.s resemble ordinary ones, and their habits, food, etc., are much the same. They are rarely seen except at night. Members of the family Anomaluridae (q.v.) are also known as F.s.

Flynn, John (1880-1951), Australian churchman, b. Moliagul, Victoria, moderator-general of the Presbyterian Church of Australia, 1939-42. F. was a member of the home mission staff of the Presbyterian Church of Victoria, 1902-10, was ordained 1911, and became superintendent of the Australian inland mission of the Presbyterian Church, 1912. He was virtually responsible for the estab. of the flying-doctor services and the wireless communication for those services throughout the isolated areas of Australia. He ed. *The Inlander*, pub. occasionally, first issue 1913. See I. L. Idriess, *Flynn of the Inland*, 1932.

Flysch, remarkably thick mass of sandstones and shales extending almost continuously from the S. Alps to the Vienna basin, and then round the Carpathians into the Balkan peninsula. Although uniform in character, it is not of the same age in every place, and probably extends from the Lower Cretaceous period to the Tertiary. It consists of material eroded from newly uplifted mts, but being itself folded is demonstrably formed during the process of mt building. This is an essential feature of F. Nowhere are fossils abundant except in the Oligocene bed of Glarus. Similar formations to the F. are found in the Pyrenees, the Apennines, the Caucasus, and in the Siwalik beds of the Himalaya. According to locality the F. is variously known as Vienna sandstone, Carpathian sandstone, Macigno, Red F., Wild F., etc.

F.O.B., abbreviation for 'free on board,' used in contracts for the sale of goods to denote that costs of carriage and delivery of the goods on board ship must be paid by the seller.

Foch, Ferdinand (1851-1929), Fr. general, b. Tarbes, of old Pyrenean descent. Educ. at Metz and was here when the Franco-Prussian war broke out, and during that war was posted to an infantry regiment. Entered the artillery school, and passed out with distinction as a gunner officer. He was a lieutenant in 1875, and captain in 1878, after a course at the École Polytechnique, Paris. In 1885 he entered the staff college, and in 1895 became instructor in military hist., strategy, and applied tactics at the college. His lectures, which are repub. in his *Principles of War*, 1903, 1918, were at once recognised as a profound analysis of the elements and conditions that had brought success to the Ger. arms in 1870-1871, and success to Fr. arms in the 40



Topical Press

MARSHAL FOCH

years prior to the battle of Waterloo. He was known before the First World War as author of a number of standard books on tactics and strategy. He was promoted lieutenant-colonel in 1898, colonel in 1903, and general commanding 13th Infantry Div. in 1907. In the First World War he served on the W. front, becoming a marshal of France in 1918, and generalissimo of the whole of the Brit., Fr., and Amer. forces in France and Flanders. From the very first days of the campaign F., who in 1914 was a corps commander, estab. his reputation as one of the most brilliant of the Allied leaders. At the Marne battle he played a prominent part in arresting the advance of the Ger. armies and saving Paris. He was in command of the Fr. centre between Sézanne and Mully, and for 3 days he was compelled, against the repeated efforts of the Germans to pierce his line, to retire. Yet promptly in the succeeding days he renewed the offensive with a stubbornness which was characteristic of his whole nature, and at last, having drawn the enemy ever further into the marshes, he took him in flank and hurled him back

the riv. He again distinguished himself in 1915 during the first battle of Ypres, his aid being invoked by F.-M. Sir John French (later Earl Ypres) when the Germans launched their first gas attack. In the great Somme offensive begun by the Brit. in the middle of 1916 the co-operation of the Fr. armies was under the direction of Gen. F. Finally in the darkest days of 1918, when it became apparent to every one that the success of the enemy armies in Europe generally was largely due to unity of command among Ger. H.Q., it was agreed by the Allies to co-ordinate the action of the allied armies on the W. front under Gen. F. The decision was taken in April 1918, and from the turning point of the last Ger. rush, namely in the middle of July at the second battle of the Marne, the Fr. marshal, by a series of remarkable actions along the entire front, gradually 'rolled up' the Ger. armies, and forced them to sue for an armistice.

As a mark of appreciation Marshal F. was made a field-marshal of Great Britain and awarded the Order of Merit. His chief pub. are *The Principles of War* and *The Conduct of War*, 1904. In these it is clear that his model is Napoleon, and that after earnest and searching examination he rejected the Ger., and particularly von Moltke's, system in principle and endeavoured to restore principles which were more in keeping with the genius and traditions of the Fr. Army. The strategy of F. inspires confidence from the fact that his own guiding maxim is that 'to hold positions is to prepare implicitly for defeat, if nothing further is attempted, if the offensive is not immediately assumed.' In his professorial capacity at the École Supérieure de la Guerre F. was before 1914 a master of the science of war. His success was therefore the practical application of sound principles of strategy combined with an absolute mastery of technique. After the Armistice F. engaged in a strenuous but fruitless struggle for a military frontier on the Rhine, though he never advocated a political annexation of the Rhineland and the Palatinate. He took his case to all the authorities: Clemenceau (who favoured it), but thought the constitution was against it, the Council of Four, the Fr. Cabinet, and the plenary conference of the Allies. He was defeated all along the line in this political campaign, which opened a breach between himself and his old friend and ally, Clemenceau, which was never to be closed. See *The Memoirs of Marshal Foch*, trans. by T. B. Mott, 1931; and M. Weygand, *Foch*, 1947.

Fochabers, vil. of Morayshire, Scotland, situated on a height overlooking the R. Spey, 8 m. E.E. of Elgin. Gordon Castle, now partly demolished, is near by, and in the vil. is a handsome public educational building which was erected by Alexander Mylne, who was a native of the par. Pop. 1000.

Focșani, or Fokshani, tn of Rumania, in the prov. of Brlad, situated on the Milcov, 135 m. N.E. of Bucharest. It is an im-

portant commercial centre, having trade with Galati. Before the World War there were soap and oil factories, tanning works, and a trade in wine and grain. The Turks were defeated here in 1789 by the Austrian and Russian allies. Pop. (1930) 32,500.

Fœsus, point to which converging rays are directed or from which rays diverge. When rays of sunlight, which may be taken as parallel, are received upon a concave mirror, they are reflected to a small area in which any object will appear to be intensely illuminated; the geometrical point corresponding to that area is called the F. of the mirror. If light is received upon a convex mirror the reflected rays diverge, but their direction may be followed backwards to a point behind the mirror, which is therefore called the 'virtual' F. When parallel rays are made to converge by means of a lens, the point where they meet is called the F. of the lens, and it is at this point, or near it, that sun's rays may be made to ignite paper, wood, etc. In geometry a F. is a point which has some definite relationship to the points on a continuous curve. Thus the F. of a parabola is a point the same distance from a point on the curve as the latter is from a fixed straight line—the directrix. An ellipse is a curve whose distance from a fixed point called the F. bears a constant ratio, less than unity, to its distance from a fixed straight line. There are 2 such foci, except in the case of a circle, where the centre is the F. In estimating the propagation of earthquake shocks, the F. is that point from which the earth-waves diverge in all directions; frequently there are 2 such foci. See also **LENS**.

Fodder, see **FATTENING FOODS**.

Foerster, Josef Buhuslav (1859–1951), Czech composer, studied in Prague, where he later held various appointments as organist, teacher, and critic. From 1893 he lived for 10 years at Hamburg, where his wife, Berta Foerster-Lanterer (1869–1936), sang at the opera. After 1903 they lived in Vienna, where he taught at the Conservatory, but from 1918 until his retirement in 1931 he was prof. of composition in Prague. He wrote 6 operas, incidental music for plays, church and secular choral music, 5 symphonies and other orchestral works, 2 violin, and a cello concerto, chamber music, numerous piano pieces and songs, and about 30 recitations with piano accompaniment.

Fœth, see **FET**.

Fœtus, embryo in its later stages of development, when it is recognisable as belonging to the species of its parents. In the first week of fertilisation the human ovum passes into the cavity of the uterus, in 2 weeks it is about $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. broad, and the folds which ultimately determine the head and the caudal region are developed. By the 4th week the embryo is curved upon itself, the rudiments of the ears appear as small nodules, and oval buds indicate the coming of limbs. The eyes are recognisable in the 5th week, and the main segments of the limbs

are defined. At 8 weeks the F. has a distinctly human appearance, the nose is prominent, the fingers are separate, and the tail becomes reduced to a rudiment; the length of the F., excluding the legs, which are small and curved inwards, is about 1½ in. In the 3rd month the limbs assume more definite proportions, nails appear on the fingers and toes, and sex can be distinguished. In the 4th month hairs are developed, and the hind limbs gain in proportion to the fore limbs; the F. is from 6 to 8 in. long. In the 6th month the length has increased to about 12 in.; eyelashes and eyebrows appear. In the 7th month the body is plumper, the eyelids open, and the F. is capable of living if b. In the 8th and 9th months the body increases in size and plumpness, the colour takes on a rosy flesh tint. At the end of the 9th month, when the F. is b., it should measure about 20 in. in length, and should weigh from 6½ to 7½ lb. In its foetal stage the embryo is of course dependent upon the maternal blood supply for nutriment. The organ of nutrition is the placenta, in which an interchange of products of the maternal and foetal circulation takes place. The connection between the F. and the placenta is the umbilical cord, which after birth becomes atrophied. *See also* EMBRYOLOGY; PREGNANCY; and OBSTETRICS.

Fog, or Mist, condition of the atmosphere produced in sev. different ways. It is due to the condensation of aqueous vapour which is always present in the air and begins to condense when the point of saturation is reached. F.s are often produced by the sudden cooling of air, owing to its meeting another current at a lower temp., and morning mists disappear as the sun's heat increases. Vapour is more readily condensed if there are nuclei for such condensation, such as salt particles. The density of the F. or M. produced depends upon the amount of aqueous vapour in the atmosphere, the temp. and pressure, and the number and size of nuclei of condensation. A cloud is simply a M. formed high up above the earth's surface. If the drops of condensed vapour are sufficiently large they fall as rain.

The drops of water in a F. are extremely small, 1 thousandth (.001) of an in. or less in diameter. A drop of .001 of an in. in diameter falls through the air at about 200 ft per hr. A F. of drops of this size would soon clear, if it were not renewed, as the height of F.s is generally less than 1000 ft. But F.s are renewed by cooling at their upper surface and by evaporation from the ground; frequently, too, there are many smaller drops which fall more slowly; a drop half the size (diameter) falls at 1 quarter of the speed. The F.s prevalent in large cities, and especially in London, are made denser and more persistent by the large number of carbon particles floating in the air. A F. will arise also where a warm, damp current of air passes over a cold surface. This phenomenon is particularly to be noticed in the region of ice floes. The F.s on the

coasts of Nova Scotia and Newfoundland are due to the warm air from the Gulf Stream passing over the colder water from the Arctic Ocean. On the other hand, M.s frequently arise from the contrary cause of cold air passing over warm water. Thus at eventide, or when a sudden fall of temp. sets in, the air cools more quickly than the water, and the water vapour becomes saturated, leading to the production of M.s so often seen over sheets of water or marshy ground. In London F.s frequently occur during the winter months, beginning usually in Sept. and reaching their greatest frequency in Nov., whence they gradually decline until the middle of Feb., after which a greater falling off takes place, the least foggy month being July. F.s usually occur on a calm day or when there is a light E. wind blowing. The record of London F.s kept since 1863 shows that the worst F. was that of 1879, which lasted practically from the beginning of Nov. to the following Feb., Dec. having no fewer than 17 foggy days. In the year 1873 no fewer than 74 F.s were recorded. The presence or absence of F. has a great effect upon the death-rate, sufferers from asthma, bronchitis, pneumonia, pleurisy, and other diseases of the lungs, as well as whooping cough, being especially affected thereby. Dense F.s in great cities are of considerable inconvenience owing to the general or partial suspension of traffic caused, and they are the chief obstacle to safe air travel. The worst example of this in London was the 'smog' of Dec. 1952 which was responsible for the deaths of many thousands of people from bronchitis and other diseases (*see* AIR POLLUTION). F.s are classified by the meteorological authorities, with the concurrence of the aviation and shipping authorities, according to the distance at which objects can be seen in daylight—a distance called the visibility. In a dense F. visibility is less than 55 yds; this may seem too great an allowance, but the classification is based primarily on the needs of planes and ships, and for these a F. is prohibitively dense if the visibility is less than 55 yds. A thick F. is one with a visibility between 55 and 220 yds, while a moderate F. is one with a visibility between 550 and 1100 yds. The distances of visibility of lights at night are adjusted to ensure uniformity of classification; an ordinary street lamp would be visible at 100 yds in a F. in which the daylight visibility was only 50 yds. *See also* METEOROLOGY. *See* D. Brunt, *Meteorology*, 1928; H. H. Clayton, *Atmosphere and the Sun*, 1930; and S. Bone, *British Weather*, 1946.

Fog Signals are audible S. used on board ship, on railways, or elsewhere, at times when lights or ordinary S. would be of no avail. The maritime code, first made in 1862, is contained in the Collision Regulations of 1910, and is universal. According to this code steam vessels under way are to sound a prolonged blast every 2 min. upon a steam whistle or siren; if under way, but stationary, 2 prolonged blasts at the same interval. A sailing

vessel under way must sound a foghorn, giving 1 blast every 2 min. if on starboard tack, 2 blasts if on port tack, and 3 blasts when sailing before the wind. When at anchor each vessel is required to ring a bell at intervals of not more than 1 min. F. S. are given on railways by laying small detonating caps upon the lines, which explode as the front wheels of the engine pass over them.

Fogazzaro, Antonio (1842-1911), It. poet and novelist, b. Vicenza. He studied literature and divinity under the Abate Zanella; law and music in Padua and Turin. His first attempts were poetry: *Miranda*, 1874, a romance in blank verse, and *Valsolda*, a vol. of peasant lyrics, 1876. Turning to fiction he produced *Malombra*, 1881, and *Daniele Cortis*, 1885, both unworthy of his genius. His next novel, *Il Mistero del Poeta*, 1888, was his first great success. His *Piccolo Mondo Antico*, 1895, is generally accepted as his masterpiece, and has been called one of the greatest It. novels. It was followed by *Piccolo Mondo Moderno*, 1901, *Il Santo*, 1905, and *Leila*, 1910. F. is a novelist of character rather than of plot, and his heroes are often the prey of grave moral conflicts. His later novels were trans. into most European languages. He also pub. 2 collections of short stories, and sev. vols. of essays. See T. Gallarati-Scotti, *La Vita di Antonio Fogazzaro* (Eng. trans. 1922); L. Portier, *Antonio Fogazzaro*, 1937; P. Nardi, *Antonio Fogazzaro*, 1938.

Fogelberg, Benedict Erland (1786-1854), Swedish sculptor, b. Gothenburg. Son of a copper-founder, he studied under Pierre Guérin, the sculptor, and Bosio. In 1820 he fulfilled the dream of his life, and went to live and work in Rome. He was recalled to his native country by royal command in 1854, but returned to Trieste in the same year, and d. there suddenly. His works display independence of thought and imagination influenced by ancient Gk art. His statues of Odin, Thor, and Balder at the National Museum at Stockholm, completed in 1845, are strong and beautiful expressions of his art. His portraits of Gustavus Adolphus, 1840, Charles XII, 1851, and of Birger Jarl, the founder of Stockholm, 1853, are full of life and vigour. See life by J. Böttiger, 1880.

Foggia: 1. Prov. of Italy, in NW. Apulia (q.v.), with a long coastline on the Adriatic. It is mountainous in the S. and the W., and in the NE. is the great mountainous peninsula of Gargano (q.v.). The centre is a plain and there are coastal plains in N. and SE. There are coastal lagoons, and sev. rivs., including the Ofanto, Cervaro, and Candelaro. The dist. was formerly a prov. of the kingdom of Naples (q.v.) called Capitanata. The prin. tns include F., Lucera, San Severo, and Cerignola (q.v.). Area 2834 sq. m.; pop. 686,000.

2. It. tn, cap. of the prov. of F., 73 m. NW. of Bari (q.v.). It stands in the centre of a plain called the *Tavoliere* (Chess-board), and was severely damaged in the Second World War. There is a

Romanesque and baroque cathedral. F. is an important centre of communications, and has cellulose, paper, engineering, and flour industries. Pop. (com.) 98,100.

Foghorn, see FOG SIGNALS.

Fogo, one of the Cape Verde Is., 184 sq. m. It is the highest in the group and has an active volcano, reaching 8800 ft above sea-level, which last erupted in 1857. The climate is good, despite occasional tornadoes. A good quality coffee is grown, as well as maize, millet, sugar, and sub-tropical grains and fruits. São Filipe is the chief tn. Pop. 16,705 (1950).

Fogou, local name given to souterrains (q.v.) in Cornwall, particularly in the Land's End dist. Carn Euny in Sancreed par. and Trelowarren in Mawgan-in-Meneage par. are well-preserved examples.

Föhn (Lat. *favonius*), originally a warm, dry wind blowing down the valleys of the Alps from high central regions, generally in the winter months. As the air sweeps over the mts it is cooled and forced to condense its water vapour. On the lee side it is warmed as it descends and is also dry. The F. wind often blows with great violence, and causes much discomfort and strain on the nervous system. Similar local winds occur in many parts of the world, on the W. coast of Greenland, in the Rocky Mts, Colorado, and New Zealand. This wind is often known as the sirocco in the S. Alps, though its nature and cause are not the same as with the true sirocco wind and the chinook in the Rocky Mts. See Buchanan, *Atmospheric Temperature during Föhn*, and E. Walter, *Der Schweizerföhn*.

Föhr, one of the N. Frisian Is. in the North Sea, belonging to Germany, off the W. coast of Schleswig-Holstein. Wild fowl abound in the autumn, oysters are exported to Hamburg, and fishing is largely carried on. Wyk is the chief tn. Area 30 sq. m.; pop. 10,700.

Foil: 1. General name for thin plates or sheets of metal, resembling a leaf in thinness. It is used in chem. for electrical apparatus, and by jewellers for backing gems of the less precious kind. The latter is sometimes known as Dutch F., and consists of small sheets of silvered copper, rolled very thin. It is coated with a mixture of isinglass and translucent colour, and is highly polished. Aluminium F. is the commonest kind, used for wrapping chocolate, tobacco, etc. Tinfoil was formerly used for these purposes. Gold-F. is chiefly used by dentists for filling teeth, and is thicker in substance than gold-leaf, which is employed principally for gilding purposes. Gold-leaf is prepared by a prolonged beating out of the metal between sheets of vellum and thick skin. The leaves can be produced in 10 different shades of colour, according to the amount of silver or copper alloy used, and are about 3½ in. square.

2. See FENCING.

Foix, title of a distinguished old Fr. family, which was famous from the 11th to the 16th cents., resident in the tn of F.

Count Roger, grandson of the count of Carcassonne (d. 1012), was the first to assume the title of count of F. He d. c. 1064. In 1190 Count Raymond Roger fought in Palestine, and assisted in the capture of Acre; afterwards he fought in the wars of the Albigenses. His estates were seized by the Church because of his alleged heresy and given to Simon IV de Montfort, but F. regained them before he d. His grandson, Roger Bernard III, was a more famous poet than a warrior; his great-grandson, Gaston III, was the best-known member of the family (see below). Gaston IV (d. 1479) married Leonora, daughter of King John of Aragon and Navarre. His grandson, Francis Phoebus (d. 1483), became king of Navarre. His sister Catherine succeeded him (d. 1517), having married Jean d'Albret (d. 1516). After Henry of Navarre became king (1589), the estates of F. became part of the royal domain of France. Another grandson of Gaston IV was Gaston de F. (d. 1512), a distinguished soldier; his sister Germaine became the second wife of Ferdinand I, king of Spain. Gaston took the command of the Fr. troops in Italy, and d. at Ravenna.

Foix, Gaston (Phoebus) III de, Comte de, and Vicomte de Béarn (1331-91), son of Gaston II. He was surnamed Phoebus because of his handsome appearance; he also bore a golden sun in his escutcheon on account of this name. He fought for France against England and defended the frontiers of Gascony, but later went to fight in Prussia. Returning to France in 1358 he rescued the royal princesses from the Jacquerie at Meaux, and at once began a war against the count of Armagnac, whom he defeated and compelled to pay a large ransom. He was appointed governor of Languedoc, but when Charles VI became king he was recalled, the duke of Berry being chosen as governor. Gaston, however, refused to give up Languedoc, and fought for 2 years, eventually retiring defeated to his own estates. His magnificent court is described in some detail by Froissart.

Foix : 1. Anc. co. of France, joined to the crown by Henry IV in 1607. It is now part of the dept of Ariège.

2. Fr. tn, cap. of the dept of Ariège, on the Ariège. It was the former cap. of F., and is a picturesque tn with many anc. buildings, including a fine, unfinished 14th-cent. church and wooden-fronted houses. It is overlooked by a castle on a rock. There are iron and leather manufs. Pop. 7800. See FOIX, family of.

Fokine, Michel (1880-1942), Russian dancer and choreographer, b. St Petersburg. He began his training under Mme Karsavina's father at the old Imperial School of Ballet. His versatility soon marked him out as an altogether exceptional dancer, and thus early he suggested reforms of the conventional ballet which have now become familiar. F. was responsible for the choreography of *Les Sylphides*, *Le Pavillon d'Armide*, and of the *Prince Igor* dances. Other triumphs of his art were *L'Oiseau de feu* and

Schéhérazade, but perhaps his supreme masterpiece was *Petrouchka*. F.'s choreography showed a keen sensibility to musical style, besides a mastery of romance and the dramatic motif through expressive action, mime, and gesture. As a reformer of the dance he ranks with Noverre and, in co-operation with Diaghilev, he raised the status of the ballet among the arts. See C. W. Beaumont, *M. Fokine and his Ballets*, 1935.

Fokker, Anton Hermann Gerard (1890-1940), Dutch aeroplane builder, b. Kediri, Java, educ. at Haarlem. Became an aviator at the age of 20, and in 1912 competed successfully in Russia—also erected a factory at Johannesthal, Berlin; in 1913 opened another at Schwerin. During the First World War he kept the Germans supplied with fighting aircraft—his biplanes and triplanes being named after him. The Ger. general staff valued his services so highly that he was naturalised by military decree, but in 1919 he liquidated his Ger. affairs and opened business in Holland. In 1924 he became a director of an Amer. aeroplane company. He developed a means of shooting through the field of a tractor-propeller. The machine with perhaps the greatest flying record was the Fokker F-7, used by Kingsford-Smith among others; it was a 3-engined monoplane, and in 1928 was flown over all the great oceans and across the Amer. continent.

Fokshani, see FORSANI.

Folard, Jean Charles, Chevalier de (1669-1752), Fr. officer and tactician, served at the battles of Cassano, 1705, and Malplaquet, 1709. His writings include *Nouvelles Découvertes sur la guerre*, 1724, *Commentaires sur Polybe*, 1727-30, 1753, *Traité des colonnes et de l'ordre profond*, 1727-30. Napoleon later adopted this column formation recommended by F. See *Mémoires pour servir à l'histoire de la vie de Folard*, 1753, and *Esprit du Chevalier de Folard*, 1761, pub. by Frederick II.

Folgermot, see FOLKMOOT.

Fotland, see BOC-LAND.

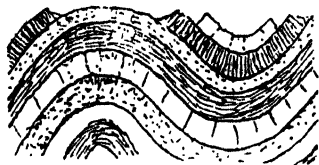
Folo-right, or **Folkright**, body of customs recognised as law in England before the Norman Conquest. The term later became synonymous with common law (q.v.). See F. Pollock and F. W. Maitland, *History of English Law*, 1898; and J. E. A. Jolliffe, *The Constitutional History of Medieval England*, 1937.

Fold, in geology, a bending of layers of rock, which is generally due to long-continued compression in the crust of the earth. F.s vary in size and shape according to the properties of the rocks affected and the nature of the forces acting on them. An arch or upfold is known as an anticline, a trough or downfold as a syncline, and an abrupt steepening in the dip of an otherwise regularly inclined bed as a monocline.

Földvár, see DUNAFÖLDVÁR.

Folengo, Teofilo (1491-1544), It. poet, (pseudonym Merlino Coccato), b. Cipada, near Mantua. He wrote mainly in Macaronic Lat., a mixture of normal Lat.

and It. words with Lat. endings. He became a Benedictine monk, but in 1524 sought release from his vows. His first pub. was *Il Baldus*, 1517, a humorous and highly unmonastic epic; this proved a success, and was followed by *Orlando*. In 1534 he returned to his monastery, where he wrote an account of his roamings entitled *Chaos del Triperuno*. Towards the end of his life he wrote a life of Christ called *L'umanità del Figliuolo di Dio*. Rabelais quotes and even copies him; the early eds. of his *Opus macaronicum* are very rare.



OPEN SYMMETRICAL FOLD

An anticline or upward bend and a syncline or downward bend

Foley, John Henry (1818-74), sculptor, b. Dublin. His first exhibits were his models of 'The Death of Abel' and 'Innocence' in 1839. His 'Ino and Bacchus,' 1840, executed in marble for the earl of Ellesmere, made him well known. With 'The Death of Lear,' 1841, 'Prospero and Miranda,' 1843, 'Contemplation,' 1845, 'The Mourner,' 1849, and 'Caractacus,' 1867, he became one of the most popular Victorian sculptors. His bronze equestrian statue of Lord Hardinge, now in front of the gov. house, Calcutta, the statues of Goldsmith and Burke in Trinity College, Dublin, and a symbolical group, 'Asia,' and a statue of the Prince Consort for the Albert Memorial in Hyde Park, are his main works. His portrait busts are noted for their likenesses.

Folgore Da San Gimignano (c. 1270-1330), It. poet. His poems, mostly sonnets, are written in a smooth and polished style, all more or less humorous and satirical. He writes about knightly customs and political questions, and also a number of poems on the months of the year and the days of the week. Rossetti trans. them into Eng., and there are also trans. by J. A. Symonds. See Rossetti, *Dante and his circle*, 1874, and *I Sonetti di Folgore* (ed. F. Neri, 1925); see also L. Santucci, *Folgore da San Gimignano*, 1949.

Foliation, geologically used to describe a plane in a rock brought out by a concentration of a certain mineral or by the parallel arrangement of many of the minerals within that plane. A gneissose F. consists of alternations of pale streaks rich in quartz and feldspar with darker streaks made up of some other constituent, usually one of the ferromagnesian minerals. As an example of the second kind of F., the arrangement of minerals parallel to a bedding plane or cleavage

can be mentioned; in this way bedding plane- or cleavage-F. arises.

Foligno, Niccolò da (1430-1502), Umbrian painter of the 15th cent. (who has been wrongly called Alunno) who lived at Foligno. He excelled in expression, and some of his works are: the altarpiece at Deruta, 1458; a Madonna in the Duomo, Assisi, besides many other works at Assisi; an altarpiece at the church of San Niccolò, Foligno; and 'The Saviour' and 'A Virgin of Mercy' in the Louvre. The 'Crucifixion' shows his ability to portray strong emotion.

Foligno, or **Fuligno** (anct Fulginia), It. tn, in Umbria (q.v.), 20 m. S.E. of Perugia (q.v.). It has a 12th-13th-cent. cathedral (now restored, after war damage), and other medieval churches. In the 15th-cent. Palazzo Trinci is a museum and art gallery. The tn was very severely damaged during the Second World War by bombing and mining; among the art treasures lost was Perugino's 'Baptism of Christ.' F. is a railway centre, and has textile, leather, soap, paper, and brick industries. Pop. (tn) 19,600; (com.) 44,000.

Folio (ablative of *folium*, leaf, or often an adaptation of It. *foglio*), with reference to pagination, a leaf of paper or parchment of a MS. or book, numbered only on the front, measuring about 17 by 22 in. Modern printing paper F. sizes are: foolscap 8½ by 13½, crown 10 by 15, large post 10½ by 16½, demy 11½ by 17½, medium 11½ by 18, royal 12½ by 20, imperial 15 by 22 in. In bibliography and printing the phrase 'in folio' is used of a sheet folded once to make 2 leaves, and hence of a book formed of such sheets, a book of a large size. In book-keeping a F. is the page or 2 pages (numbered alike) in a ledger on which the creditor and debtor account is entered.

Folk Dancing, the simple, spontaneous, and uninstructed dances of people in small tns and country places. The word F. means the common people, and such phrases as F.-lands, F.-lore, and F. D. are related to the rights, the customs, the habits and life of the ordinary pop. In every country of the world dancing has played its part, and practically everywhere is susceptible of a rough div. into 2 main parts: formal and spontaneous. In its more stately and intentional manner dancing has been surrounded with rigid rules, precise etiquette, or social custom from anct times when it was part of religious ritual to the later day of pomp in court balls. In its simpler aspect it has been part of the play of the children in the street and a natural outlet of the spirits of adult merry-makers on the vil. green. Dancing is now influenced by professionalism, and the habit of the professional mind is to adopt the convenient plan of limiting its definition to a specific style. In the strict language of the dancing instructor, F. D. is not quite the same as country dancing, but in a looser and more general use of words the 2 phrases are interchangeable. In England the Eng. Folk Dance and Song

Society leads a vigorous movement to keep alive and revive popular interest in F. D., which except in the N. had virtually *d.* out late in the 19th cent. Cecil Sharp, a devoted pioneer, worked hard to preserve F. music and F. D. before it became extinct. The Brit. Gov. gives a grant to assist the organisation of the pastime on the ground that F. D. is a traditional and inexpensive means of keeping the people cheerful and healthy. See J. Diack, *Folk Dances of Europe*, 1910; and D. Kennedy, *England's Dances: Folk Dancing To-day and Yesterday*, 1948.

Folk High Schools. Dan. residential, non-vocational S. or colleges for adults. Winter courses last, as a rule, for 5 or 6 months; the summer courses are shorter. Three main influences led to the foundation of the now world-famous F. H. S., the first of which was estab. in 1844. The leaders of the movement wished to fortify the Dan. people in S. Jutland against Germanisation. Thus through the 'living word' Bishop Grundtvig, the father of the movement, hoped to arouse in the ordinary people a consciousness of their national culture. This nationalistic element was much stronger after the disasters of 1864 when Schleswig-Holstein was lost to Germany. The second strong influence was the view that in their movement towards independence the peasants should be equipped to take their place in the rising political democracy by knowing their rights and their obligations as citizens. Finally, Grundtvig's ideas on Christianity lent the movement a strongly religious bias, still existent in the F. H. S. to-day. Throughout the country there are some 60 S. Their general aims are similar and the typical syllabus is centred round Dan. language and literature, Scandinavian hist., gymnastics, and arithmetic. But Dan. social conditions, world affairs, and scientific-economic subjects find their place. There are no examinations, and although the S. are now heavily subsidised from state funds, any interference by the authorities has been strongly resisted. Great freedom is allowed both to teachers and students to pursue their cultural interests. Independent work is important and centres on well-stocked libraries.

Inevitably ideological and operational differences exist. Some F. H. S. emphasise one activity, others another. The Inner Mission H. S., for example, and those of other religious sects, have a greater sectarian bias than the Grundtvigian ones. Some specialise in gymnastics, others emphasise agric., artisan, or craft studies. Another group of S. is interested in international co-operation. There are also F. H. S. for industrial workers. These, contrary to the general tendency, draw their students from the towns and factories rather than from rural areas and agriculture. There is little doubt that the movement has been very influential in developing attitudes and outlooks that have made the world-famous Dan. co-operatives work so well.

Perhaps, of them all, Askov is the most famous. Opened in 1865, it has become the High School 'univ.' and has trained over the years many teachers who subsequently set their mark on the movement. To-day Askov, with over 300 students, is the largest F. H. S. and provides advanced education for people from all parts of the country, most of whom have already attended other H. S. In this 'extended' school opportunities are provided for courses continuing through 2 or 3 winters. The F. H. S. movement spread to other Scandinavian countries and later to many nations in Europe and elsewhere.

Folk-Lore Society, estab. in 1878 for the purpose of collecting, recording, and studying the traditions and culture of the people. The S. publishes a quarterly jour., *Folk-lore*, containing, besides minutes of the S.'s meetings, papers on aspects of folk-lore, records of the folk-lore of given areas or dists., notes, communications, and reviews of Eng. and foreign books on folk-lore and kindred subjects. It has an extensive library.

Folk Music, traditional melodies, the spontaneous expression of national temperament in songs, and in dance tunes played by a great variety of frequently rustic instruments. The div. between F. M. and 'art' music in Europe and the Americas is not, as is often said, that the former is a kind of natural growth, whereas the latter is attributable to a composer, since all organised music—and F. M. is often highly organised in its own way—must have been originally invented by one single person, who is a composer whether he writes down a tune or merely improvises it. But 'art' M. is fixed by notation and remains essentially unchanged, except by interpretation and possibly ornamentation, whereas F. M. is transmitted orally from generation to generation, suffering a continual process of small changes as memory fades or new fancy dictates; changes affecting words, rhythm, melodic intervals, and to a much smaller extent the formal construction of a tune, which can be quite elaborate. The style of a tune, however, remains practically unchanged, so that its age cannot be determined on stylistic grounds or by the manner of a period, as in the case of European 'art' M. even where its date of composition is unknown. Much less do dates of original pub. help, as in the latter case, another characteristic of F. M. being that it was never pub. at the time of its origin. The tunes are therefore ageless and can neither be assigned to any particular century nor imagined ever to 'grow out of fashion.' If the essentials that make F. M. are borne in mind, it is impossible to agree with the view until recently held, especially in Ger.-speaking countries, that a composer's song, if it is only simple and popular enough, can become a folksong. The *Lorelay*, for instance, although regarded as such, is decidedly not a folksong, for both its poet (Heine) and its composer (Silcher) are known, it is of no particular antiquity

and it was pub. at the time of its composition. Many of the popular songs ed. by Brahms are not genuine folksongs either, nor are his *Hungarian Dances* or Liszt's *Hungarian Rhapsodies* (the latter based on Gypsy M., not on true Magyar tunes) to be regarded as F. M. Many composers, however, have used F. material in their work or, more often and more successfully, written M. of their own that is closely modelled on or deeply influenced by such material without actually using existing tunes. A few of those who might be named are Tchaikovsky as well as the more determined nationalists in Russia, Chopin in Poland, Smetana and Dvořák in Bohemia, Grieg in Norway, d'Indy in France, Albéniz and Falla in Spain, Vaughan Williams in England, Janáček in Slovakia, and so on. The systematic collecting of folk tunes is a recent movement, apart from a few early pioneers, and in some countries, where the cultivation of F. M. has almost d. out, it was undertaken only just in time to yield a representative crop. Cecil Sharp in England, Stanford and Herbert Hughes in Ireland, Bourgauff-Ducoudray in France, Bartók and Kodály in Hungary, and others elsewhere, have both collected and edited tunes rescued from threatened oblivion.

Folkestone, municipal bor. and seaport in Kent, England, about 6 m. WSW. of Dover and 72 m. from London. It has a deep-sea harbour, begun in 1881, admitting vessels of from 10 to 12 ft draught at high water, and the shipping entering and leaving the harbour is about 1,000,000 tons per annum. The tn lies in a hollow between 2 high cliffs on the Eng. Channel. F. is opposite Boulogne, and forms a gateway to the Continent. The Leas, on the top of cliffs 130-180 ft high, form a tableland of lawns, 2 m. in length; the Leas Cliff Hall is built into the face of the cliff and is used for concerts and for conferences. At the foot of the cliffs are wooded walks. To the E. of the tn is the E. Cliff, and beyond lies the Warren, an area of undisturbed natural beauty. Other parks and open spaces are Radnor Park; the sports ground on the Cheriton Road, with a co. cricket ground; and the Westernhanger race course (about 5 m. from the tn), where 6 meetings are held yearly. Kingsnorth Gardens, near the Central Station, are laid out in the It. style. Among places of entertainment are the Pleasure Gardens Theatre, the Leas Pavilion, and the Marine Gardens Pavilion. F.'s anct par. church, dedicated to Sts Mary and Kanswythe, stands on a site that was previously occupied by a priory. This has disappeared, as has also the first nunnery in England, which stood near it, founded by St Kanswythe, granddaughter of St Ethelbert, king of Kent, to whom sev. miracles are ascribed. The church dates back to the 12th cent. and is of great historical interest. It possesses a fine stained-glass window given by members of the Brit. medical profession to commemorate Wm Harvey (b. in F. on 1 April 1578), discoverer of the

circulation of the blood. The free grammar school was founded in 1674. There is a fine central library on Grace Hill, and a branch was opened at Cheriton in 1938. The art gallery and museum occupy the upper floors of the central library. The tn was frequently raided by enemy aircraft in the Second World War, but a progressive policy of rehabilitation has restored the tn's many amenities. Pop. 43,560 (1953).

Folklore, science of the elucidation of the peasant and local elements in modern culture. These elements in contemporary primitive cultures are the domain of anthropology (q.v.). In all customs and traditions of the peasant class in all countries are embedded the knowledge of past events which hist. ignores, and religious and legal observances, the significance of which has long been forgotten. Those fragmentary survivals of a savage past are to be found in such apparently meaningless entities as game rhymes, nursery rhymes and tales, ballads and marches, vil. ann. observances, and old saws. These survivals of an older culture remain among the non-progressive portion of the pop., and their analysis and elucidation constitute the science of F., in which there are 2 main fields of study: that of superstitions, including proverbs, songs, and popular sayings; and that of folk-tales.

The logical and inductive treatment of traditions respecting persons and places often results in the elucidation of facts which throw considerable light upon the dark places of hist. Thus the children's rhyme 'London Bridge is broken down,' when taken in conjunction with sundry Eng., Breton, and Norse folk-tales, reveals first the intense interest and wonder of the Britons of the Rom. period in the architectural work of an alien and superior culture, and secondly illustrates the fact that London Bridge was captured by King Olaf the Dane in the 10th cent.

The little that can be gleaned concerning some characters known to be historical may be supplemented by F., as in the case of Hereward the Wake, Rob Roy, and Wm Tell, tales regarding whom are prevalent in the dists. where they dwelt. But in such cases the wonder element is mingled with fact, and discrimination is necessary to arrive at sound conclusions.

The testimony of F. as regards anct religious practice is chiefly afforded by old vil. or civic observances, customs in connection with calendric or seasonal changes or 'sacred' wells. For example, the tn of Hawick, in the Scottish border country, possesses an anct civic rhyme sung annually at the riding of the tn marches, which commences 'Teribus and Teri Odin.' This in A.-S. is 'Tyr habbe us, ye Tyr, ye Odin,' or 'Uphold us, Tyr: uphold us, Odin,' so that the lay is undoubtedly a fragment of an invocation to the N. war-god Tyr and the All-Father Odin.

Again in many parts of Great Britain and Ireland 'sacred' wells are found, the bushes surrounding which are covered

with rags. In pagan times these springs were regarded as the haunt of a minor deity or spirit to whom sacrifice was periodically rendered. The rags surrounding these shrines are still offered up by the country folk, and the practice is strikingly illustrative of the substitution of the part for the whole, which follows the breakdown of the practice of human sacrifice, the rag representing a part of the person who makes the sacrifice. Fragments of worship of the rain-god are often retained in connection with well worship, as in the Isle of Gigha, off the coast of Scotland, where the water of a sacred well is blown to the 4 quarters of the heavens when rain is desired.

The legal aspect of F. is important. Many rhymes employed by the peasant class are fragments of ancient law. Thus the Scottish children's rhyme, 'Tappie, tappie touse, will ye be my man?' probably typifies the surrender of a freeman to an overlord. The rhyme gathers greater significance when we learn that the speaker seizes by the foretop the child to whom he addresses the words. Countless gifts of land are still commemorated in doggerel, and it is significant that until a late date in Eng. law it was admitted as a principle that if oral declarations conflicted with written instruments the former had the more binding authority.

Many folk-tales describe a constitution of society which is plainly barbarous. Implicit in them are vestiges of marriage by capture, totemism, fetishism, witchcraft or shamanism. In elucidating these—as indeed all F. problems—the anthropological method, or argument by analogy from the habits and customs of existing savage races, is insisted upon by folklorists in contradistinction to the mythological method, or elucidation by reference to natural phenomena. Where the folklorist sees only the record of some prehistoric custom or event, and the mythologist espies the hist. of a sun-god, the impartial observer may discover traces of both, or neither. But there are many cases in which both methods may be singly employed. Thus by the anthropological we find in old tales the savage elements which prove their vast antiquity, to which has been super-added during the centuries a certain amount of the matter of modern culture. A considerable amount of work has also been done on such tales and myths by psycho-analytically minded researchers. But, like many mythologists, these symbolists have failed to realise that mere conjecture and possibility are almost worthless without some firmer demonstration of hypotheses.

Turning from folk-tale to folk custom pure and simple, the exact description of which is dubious, and which may or may not refer to religion, law, or hist., we have such phenomena as 'sin-eating' (q.v.), the Irish customs of placing a dead person's hand in the milk-pail in order that the milk may increase in richness, and taking mould from graveyards for medicinal purposes, and so forth. Lastly, differ-

ences in race may be traced in many folk customs; thus the daubing of the bridegroom's feet with soot in N.E. Scotland, the painting of the Southam 'Godiva,' the slaughter of the ram lamb at Holne, are all possibly remnants of non-Aryan culture. The race has become absorbed, but its customs remain in a more or less fragmentary condition.

See A. Banier, *The Mythology and Fables of the Ancients*, 4 vols., 1739-40; H. Ellis and W. C. Hazlitt, *Brand's Popular Antiquities of Great Britain. Faiths and Folklore*, 2 vols., 1905; N. W. Thomas, *Bibliography of Anthropology and Folklore*, 2 vols., 1907-8; J. G. Frazer, *The Golden Bough*, 12 vols., 1911-15; E. B. Tylor, *Primitive Culture*, 2 vols., 1924; B. Malinowski, *Myth in Primitive Psychology*, 1926; R. S. Loomis, *Celtic Myth and Arthurian Romance*, 1927.

Folkmoot, or **Folcgemot** (folk-meeting, O.E. *folc*, people, *gemot*, assembly). Limited evidence exists that there were local popular courts of some kind among the early A.-S. settlers in England, possibly modelled on the Germanic assemblies described by Tacitus. But the early references are few. Not until Alfred's reign does the actual word *folcgemot* appear in the laws, and then in a context which implies something more like the later shire court than like the primitive Germanic popular gathering. However, it is known that in London before the Conquest there existed a F. which met in the open on a hill in the N.E. of the city and which had the fundamental characteristics of a popular assembly. An extensive and controversial literature exists on the subject of F.s, but see W. Stubbs, *Constitutional History of England*, 1874-8; F. Pollock and F. W. Maitland, *The History of English Law*, 1898; and F. M. Stenton, *Anglo-Saxon England*, 1943.

Folklright, see **FOLC-RIGHT**.

Follicle, in anatomy, a small tubular gland. A dental F. is a sac enveloping the developing tooth; a Graafian F., one of the small vesicles in the ovary (q.v.), each containing an ovum; sebaceous F.s, the glands of the skin which secrete sebum; hair F.s, the sacs enclosing the roots of the hair.

Folquet de Marseille (c. 1150-1231), Provençal troubadour of lt. race. He wrote many love songs and a moving lament on the death of his patron Barral de Baux. In 1198, being weary of love and having taken holy orders, he became abbot of Le Toronet in Provence. See S. Stronski, *Le troubadour Folquet de Marseille*, 1910.

Foldiceni, see **FALTICENI**.

Fomentation (from Lat. *foveo*, I warm), method of applying warmth to some part of the body, but very often the term is used to signify the substances used. F.s are used to remove pain and relieve inflammation, and a simple one is made by dipping flannel into very hot water, boiling if possible, and wringing it out in a towel. This should be applied immediately and covered with wool and

waterproof sheeting to prevent the escape of the heat. As soon as this becomes cool it should be replaced by another flannel. Very often boracic powder is dissolved in the hot water.

Femorians, anc. race of gods in Irish Gaelic tradition, related to the pre-Celtic race known in Irish story as Fir-boigs. Though the Celts regarded them as baneful, they were generally regarded as peaceful agric. deities. The most prominent was Balor of the Evil Eye.

Fonblanque, Albany William (1793-1872), Brit. journalist of Huguenot descent. He studied law, but turned to journalism, in which he took a high place. From 1828 to 1847 he was editor and then also proprietor of the *Examiner*, enhancing the reputation it had already won under Leigh Hunt. His best articles were pub. as *England under Seven Administrations*, 1837, and he also wrote *How We are Governed*, 1858. See life by E. B. Fonblanque, 1874.

Fond du Lac, city, cap. of F. du L. co., Wisconsin, U.S.A., at the S. of Lake Winnebago, 55 m. NW. of Milwaukee, in a dairying and resort area with railway shops and limestone quarries. It manufs. precision tools, machinery, refrigerators, textiles, and clothing. Pop. 29,900.

Fondi (anc. Fundi), lt. tn, in Lazio (q.v.), on the Appian Way (q.v.), 28 m. SE. of Latina. Close by is a salt lagoon, *Lago di F.* (anc. *Lacus Fundanus*). It has anc. walls, a ruined Colonna (q.v.) castle, a Gothic church which was formerly a cathedral, other fine churches, and a Dominican convent where St Thomas Aquinas (q.v.) taught. Very severe damage was done to the tn by bombing during the Second World War. Pop. (com.) 18,000.

Fons Sanus, see FOSSANO.

Fonsagrada, Sp. tn in the prov. of Lugo. It has an agric. trade and flour mills. Pop. 19,000.

Fonseca, Manoel Deodoro da (1827-92), first president of the United States of Brazil, b. Alagoas (q.v.), now named *Marechal Deodoro* in his honour. He entered the army, and took part in the wars against Montevideo (1864) and Paraguay. On 14 May 1887 he issued a manifesto defending the political rights of military officers, and won over the entire army. When Corrêa de Oliveira became Conservative Prime Minister he gave F. a command. Six months later the ministry was overthrown; soon afterwards F. returned and was persuaded to head an insurrection. The result was a bloodless victory and the proclaiming of a rep., of which he became president (Feb. 1891). In the following Nov. he retired from public life.

Fonseca, Marchesa de (née Eleonora Timental) (c. 1768-99), Neapolitan patriot, married (1784) to the marquis of F. Introduced to the court of Ferdinand I, she became for a short time maid of honour to his queen, Marie Caroline. In 1789 she espoused the cause of the Fr. Revolution. Her salon at Naples was the H.Q. of opposition to the court, and she

founded and ed. the *Montitore Napoletano* during the brief rule of the popular party in Naples (1798-9). On the restoration of Ferdinand she was executed.

Fonseca, Gulf of (Amapala Gulf or Bay of Conchagua), large gulf (700 sq. m.) of the Pacific, bordered by Salvador, Honduras, and Nicaragua, in W. Central America, discovered 1522-3, and named after the bishop of Burgos. The volcanoes Conchagua and Cologuina are on either side of the entrance (about 21 m. apart).

Font (Lat. *fons*, a fount), vessel or basin for the water used for the rite of baptism. Primitive Baptistries (e.g. in the Duomo at Naples) contain a basin in the floor large enough for the immersion of adult converts. When infant baptism became the general rule this was much diminished in size, and was placed higher. When baptism was generally by affusion the size decreased still more until, as now, the F. was a basin about 2½ ft in diameter or less. The material is generally stone and is often lined with lead. In the Middle Ages examples of F.s composed entirely of lead also occur. The exterior is generally octagonal, sometimes circular, square, or hexagonal, and is frequently decorated in a rich manner. The F. almost always stands at the W. end of the church. It is sometimes enshrined in a special chapel, or Baptistry, dedicated to St John the Baptist. Elaborate covers often hang over the F. In the Rom. Catholic Church these are locked to protect the water (blessed and mingled with Chrism) which is used for baptisms throughout the year. The covers also serve to give a proper dignity to the F., as representing a prin. sacrament of the Church.

Fontaine, Jean de la, see LA FONTAINE.

Fontaine-l'Évêque, tn in the prov. of Hainaut, Belgium, 6 m. W. of Charleroi. It has coal-mines and freestone quarries, and manufs. of iron, nails, knives, bolts, chains, boilers, etc. Pop. 8,600.

Fontainebleau (Fontaine Belle Eau, Lat. Fons Bellaqueus or Bleaudi), Fr. tn in the dept of Seine-et-Marne, near the Seine, 37 m. SSE. of Paris. It is situated in a magnificent forest of 42,500 ac., one of the loveliest wooded tracts in France, greatly esteemed by landscape painters (see, e.g. under BARBIZON). The celebrated royal palace was traditionally founded by Philip the Good (q.v.), but, as it exists to-day, was begun by Francis I (q.v.). Here Napoleon signed his abdication in 1814. The tn manufs. porcelain, glass, and gloves, and there are sand and stone quarries. Grapes (called 'F. grapes') are cultivated. Philip IV, Francis II, Henry III, and Louis XIII (q.v.) were b. here. Pop. 15,000. Consult E. Bourges, *Recherches sur Fontainebleau*, 1896; L. Tarsot and M. Charlot, *Palace of Fontainebleau*, 1902; Marie Louise Gothein, *A History of Garden Art* (trans. by Laura Archer-Hind), 1928; and E. Pilon, *Fontainebleau* (trans. 1933).

Fontana, Domenico (1543-1607), It. architect, b. Mill, near Como. In 1563 he went to Rome and Cardinal Montalto

became his patron; under his auspices he built a chapel in the church of Santa Maria Maggiore and the Villa Negroni. When his patron became Pope Sixtus V he carried out alterations to the Lateran Palace, the Quirinal, and the Vatican library. His most remarkable achievement, however, was the removal of the Egyptian obelisk (brought to Rome in the time of Caligula) from Nero's circus (now Piazza Pia) to the Piazza of St Peter's (1586), of which he leaves a written account. When Clement VIII became pope, F. was dismissed and went to Naples, where he became architect to the viceroy, the count of Miranda, and built the Royal Palace (1600 onwards). His son, Giulio Cesare, succeeded to his post and built the Naples Univ.

über Fontane, 1933; R. R. Knudsen, *Der Theaterkritiker Fontane*, 1942.

Fontanes, Louis Marquis de (1757-1821), Fr. poet and politician. In 1783 he pub. a trans. from Pope, *L'Essai sur l'homme*, *La Chartreuse*, and *Le Jour de mort*, and in 1788 *Le Verger* and *Épître sur l'édit en faveur des non-catholiques*. Under Napoleon he became president of the legislative chamber from 1804 to 1810. His *dégo* on Washington was written at Napoleon's request. He was a brilliant speaker, one of his best speeches being made in 1814 as *Grand Maître* of the Univ. His verse was technically skilful, but is now forgotten. His works were collected in 1839 and ed. by Sainte-Beuve with a life of the author. See A. Wilson, *Fontanes*, 1928.



D. McLeish

THE PALACE, FONTAINEBLEAU

Fontana, Prospero (1512-97), It. painter, b. Bologna. He belongs to that period of the Bolognese school that was influenced chiefly by imitators of Raphael. At Bologna he started a school of art, and among his pupils were Lodovico and Agostino Carracci. His masterpiece is the 'Adoration of the Magi,' in the church of Santa Maria delle Grazie at Bologna.

Fontane, Theodor (1819-98), Ger. poet and novelist, b. Neuruppin, Brandenburg. His literary method changed with the years, and gradually moved from historical romance (*Vor dem Sturm*) to realism. His best novels, all written when he was over 60, describe every-day life in modern Berlin: *Irrungen Wirrungen*, 1888, *Effi Briest*, 1895, *Der Stechlin*, 1898. He toured England and interested himself in O.E. ballads; his *Gedichte* and ballads (*Männer und Helden*) tell of the glories of old-time England. He was also a free-lance journalist, and one of the first to defend Ibsen and Hauptmann as dramatic critic in the *Vossische Zeitung*. See K. Hayens, *Theodor Fontane, a critical study*, 1922; F. Behrend, *Aufsätze*

Fontarabiz, see FUENTERRABIA.

Fontenay-le-Comte, or Fontenay-Vendée, Fr. tn, cap. of an arron., in the dept of Vendée. It has numerous fine ancient buildings, including the 16th-cent. church of Notre-Dame, with its 261 ft high tower. Leather goods, hats, and coarse linen are manuf. Pop. 9800.

Fontenay-sous-Bois, Fr. tn in the dept of Seine, an E. suburb of Paris. There is much trade in wood, and market-garden produce. Pop. 30,200.

Fontenelle, Bernard le Bovier de (1657-1757), Fr. philosopher and poet, nephew of Cornille, b. Rouen. He has been called 'one of the last of the Précieux, or inventor of a new combination of literature and gallantry,' and was in Voltaire's eyes the most universal genius of his age. He wrote tragedies (*Aspar*, 1681), operas (*Psyché*, 1678, *Bellérophon*, 1679), pastorals like those of Segrais, 1624-1701, and *Lettres galantes du chevalier d'Her*, 1685, in the style of Voiture (1598-1648). In 1688 he sided with the moderns in the 'Quarrel of Ancients and Moderns.' In La Bruyère's *Caractères* he is satirised as Cydias. He had a brilliant reputation in

the salons of the time, and was at the height of his fame under Fleury's ministry (1736-43). His works include: *Poésies pastorales*, 1688; *Dialogue des morts*, 1683; *Entretiens sur la pluralité des mondes*, 1686, maintaining the fascinating paradox that planets and fixed stars are populous worlds, *Histoire des oracles* (suggested by van Dale's work), 1700; *Éloges des Académiciens*, 1699-1740. Admitted to the Fr. Academy (1691), in spite of Racine's and Boileau's opposition, he was also admitted to the Academy of Sciences (1697), and was secretary from 1699 to 1741. His *Éléments de la géométrie de l'infini* appeared 1727; *Théorie des Tourbillons cartésiens* in 1752. F. is one of the first successful popularisers, who by his elegant and lively style introduced science and philosophy into the salons. See collected works, 1790 and 1825; É. Faguet, *Études littéraires sur le XVIII^e siècle*, 1890; A. Laborde-Millaud, *Fontenelle*, 1905; J. R. Carré, *La philosophie de Fontenelle*, 1932; F. Grégoire, *Fontenelle*, 1947.

Fontenoy, vil. in the prov. of Hainaut, Belgium, 5 m. SE of Tournai. It was the scene of the battle of 1745 when, during the War of the Austrian Succession, the Fr. under Marshal Saxe defeated the duke of Cumberland and his allies, the onslaught of the Irish Brigade, which was fighting for the Fr., being irresistible. Pop. 700.

Fontevault-l'Abbaye, in the dept of Maine-et-Loire, 9 m. SE. of Saumur. Here, in 1099, a great abbey was founded, which became the mother-house of the Order of F. In later times the abbess of F. generally belonged to the Fr. royal family. The abbey was converted into a prison in 1804. Pop. 2500.

Fonteyn, Dame Margot (1919-), ballerina. She studied with Goncharov and Astafieva. After entering the Sadler's Wells school in 1934, she made her début with the Vic-Wells Ballet that same year. Following the departure from the company of Markova (q.v.) in 1935, F. made rapid progress, gaining in authority and reputation until by the outbreak of war her supremacy was fully estab. She has created many roles, particularly in ballets by Ashton (q.v.), and excels in the great classical ballets such as *Le Lac des cygnes* and *The Sleeping Beauty*. She has also danced with the Ballets de Paris as guest artist, creating the leading role in *Les Dames de la nuit*, has appeared at the Granada Festival in Spain, and has gained many triumphs abroad with the Sadler's Wells Ballet. She succeeded Dame Adeline Genée as president of the Royal Academy of Dancing in 1954, was awarded the C.B.E. in 1951, and created a D.B.E. in 1956.

Foochow, Fuchow, or Minhou, cap. of the prov. of Fukien, China. It is on the R. Min, 34 m. from its mouth, and has been open to foreign merchants since the first Chinese war in 1842. Suburbs sprawl in every direction, but the city itself is girded by upwards of 5 m. of wall, 30 ft high, topped at intervals by curious watch towers and pierced by 7 gates.

The riv. is spanned by the 'Bridge of Ten Thousand Ages,' which is supported by 40 granite piers, and which was probably built in the 11th cent. The chief export is tea. The staple imports are woven and metal goods. The prov. of Fukien is its outlet for tinned food, bamboo-pulp paper, and soap. The great arsenal on Pagoda Is. was instituted by Fr. engineers in 1867. F. has one of the few dockyards in China. Since 1921 it has been the seat of the Christian Univ. The Japanese occupied F. for some years following their invasion of China, but in May 1945 Chinese troops retook the port. After the liberation of F. by the Chinese People's Army in 1949, the Nationalist régime in Formosa seized Matsu Is. off the coast of F. Pop. 400,000.

Food, Adulteration of, see ADULTERATION.

Food and Agriculture Organisation (F.A.O.) was first proposed by the U.N. conference on F. and A. held at Hot Springs, Virginia, May 1943. An interim commission formulated a constitution for the O., which was adopted by a later conference held at Quebec, Nov. 1945. This later conference estab. the F.A.O., the constitutional purposes of which are to raise the levels of nutrition and standards of living of the peoples under the respective jurisdictions of the U.N.; secure improvements in the efficiency of the production and distribution of all F. and agric. products; better the condition of rural pops.; and thus contribute towards an expanding world economy. The functions of the F.A.O. are to collect, interpret, and disseminate information on nutrition, F., and A., and to promote national and international action with respect to scientific and economic research relative to these topics; the conservation of natural resources; the improvement of processing and marketing; the adoption of policies for the provision of adequate agric. credit; and other matters. Provision is made for an ann. conference of F.A.O. to determine the policy and approve the budget of the O. and make recommendations for submission to member nations with a view to national action. The F.A.O. is run by a director-general and his staff, a council, and a conference (of 1 representative from each member-state: this conference elects the council of 24). It is financed by contributions from its members. Its H.Q. are in Rome.

Food and Diet. F. (from a Teutonic root, whence O.E. *foda*—cf. 'fodder') is anything taken into the body which is capable of supplying physical energy, promoting growth, repairing tissue, furnishing energy for bodily heat and work, and aid in protection from disease. Man is the only animal who does not know instinctively how to select his F., and so the science of dietetics has evolved. He is also the only animal who cooks his F., which may render it more appetising to some people, but certain F.s become less digestible and not so nutritious as in their natural raw state. On the other hand, heat destroys harmful bacteria, particu-

arly in meat and milk (see C. E. Dukes, *Bacteria in relation to Domestic Science*, 1947).

The solid or 'nutritious' components of F. fall into the following classifications:

NITROGENOUS

Proteins:

Casain: precipitated from milk, especially by rennet; important in cheese.

Myosin: present in the muscle or fibres of meat.

Gluten: present in the viscid matter (dough) of wheat.

Legumen: found in pulses, i.e. peas, beans, lentils, etc.

Albumen: found in egg white, milk, muscle, vegetables, etc.

NON-NITROGENOUS

Carbohydrates: starches and sugars.

Fats: olive oil, butter, etc.

The 2 groups, organic in origin are derived from living organisms. The first, or nitrogenous, group is essentially composed of nitrogen, carbon, hydrogen, and oxygen; is mainly flesh forming, building up and repairing nitrogenous tissues of the body; and, in the process, supplying a limited amount of heat. The second, non-nitrogenous, group (sometimes called carbonaceous compounds) is composed of carbon, hydrogen, and oxygen, and is the main source of energy and heat. The *inorganic* or *mineral matters* in F. include sodium, potassium, iron, sulphur, calcium, phosphorus, iodine, etc. They are necessary for the normal building and functioning of the body, the greatest proportion being found in the bones. Most of these inorganic matters are contained in organic F.s, e.g. iron in meat and egg yolk; calcium and phosphorus in milk; iodine in fish, etc. Vegetables, grown in fertile soil, are also an important source of mineral salts, some of which salts can only be absorbed by the body in their natural combinations in F. Certain mineral matters cannot be utilised by the body unless particular *vitamins* are present. Vitamins are minute substances in natural F., and are essential to health (see VITAMINS). There are also certain complex organic substances (enzymes) which by their presence alone set up catalytic action in the digestive organs; and it is probable that these substances are present in natural F.s but, by refinement or concentration such F.s become relatively 'indigestible.' *Roughage* in F., i.e. the unabsorbed cellulose from vegetables, fruit, whole wheat, flour, bran, etc., is necessary to supply bulk for the elimination of waste matters; and, in the refinement of F.s, valuable material which aids digestion and nutrition is discarded.

The amount of F. required in health is determined generally by the size and muscular output of the individual; but the growing child needs relatively more than his parents; and the adult muscular worker requires more energy-producing F. than the sedentary worker. The

energy value of F. is measured in 'calories,' i.e. the amount of heat (great calories) required to raise a kilogram of water 1° C. The calorie value of F. varies, e.g. carbohydrate giving only half as many calories as its equivalent weight of fat.

The following table (pub. in 1933, and printed by permission of the Brit. Medical Association) shows the approximate number of calories required for the average child and adult:

MAN-VALUES AT AGES (CATHCART AND MURRAY)

	Age	Man-value	Calories
Adult male	.	1.00	3400
" female	.	0.83	2840
Child 1 and under 2 years	.	0.30	1020
" 2	" 3	0.40	1360
" 3	" 6	0.50	1700
" 6	" 8	0.60	2040
" 8	" 10	0.70	2380
" 10	" 12	0.80	2720
" 12	" 14	0.90	3060
Old person (65+)	.	0.75	2550

A definite proportion of calories should be derived from first-class protein, second-class protein, fat, and carbohydrate, in order to fully supply the needs of the body. The recommended proportion is 6 per cent first-class protein and 6 per cent second-class protein; 27 per cent fat, and 61 per cent carbohydrate. The following table shows the total calorific value of certain F.s, together with their protein, fat, and carbohydrate content:

TABLE OF FOOD VALUES. ANALYSIS AND ENERGY VALUE OF EDIBLE PORTION TAKEN FROM TABLES. (R. H. A. PLIMMER, D.S.C.)

	Per lb. (or 453.5 gm.)	Protein (gm.)	Fat (gm.)	Carbo- hydrate (gm.)	Cal- ories
Beef, fore-quarter	.	85.3	83.5	—	1126
—, hind-quarter	.	75.3	135.6	—	1570
—, corned (Glasgow analysis)	.	119.3	84.8	—	1278
Mutton	.	50.4	169.2	—	1780
Liver, ox	.	90.3	14.5	20.0	587
Sausage, beef	.	50.8	80.3	68.9	1238
Suet, beef	.	5.4	423.2	—	3958
Dripping, or lard	.	—	453.5	—	4219
Fish, cod	.	66.2	0.4	—	276
—, herring, fresh	.	66.2	39.9	—	643
—, —, kipper	.	64.0	50.4	—	730
—, —, salted	.	100.7	57.2	—	944
—, baddock, fresh	.	54.4	0.9	—	232
—, —, smoked	.	67.6	0.9	—	286
—, ling	.	61.7	1.8	—	270
—, mackerel	.	49.9	28.1	—	466
Bread, white	.	32.7	0.9	218.2	1037
—, brown	.	31.8	1.8	216.4	1012
Flour	.	45.8	7.3	342.5	1660

Per lb. (or 453 g.)	Protein (gm.)	Fat (gm.)	Carbo- hydrate (gm.)	Cal- ories
Milk (pint)	18.7	20.4	27.2	378
Eggs	50.3	45.8	6.3	659
Bacon,				
streaky	46.7	245.8	—	2478
—, shoulder	35.8	261.3	—	2577
Cheese, hard,				
full milk	116.6	158.8	14.1	2011
—, skim	146.1	52.6	42.6	1260
Butter	0.9	376.5	—	3503
Margarine	0.9	384.7	—	3579
Sugar, white	—	—	435.6	1860
Jam	1.4	—	314.8	1269
Treacle	7.3	—	271.7	1144
Syrup, golden	1.4	—	346.6	1427
Cocoa	82.1	12.16	182.8	2215
Currants,				
dried	7.7	1.4	190.5	826
Prunes	11.3	0.9	153.8	685
Dates	6.3	0.4	268.5	1131
Rice, polished	26.8	1.8	364.2	1620
Oatmeal,				
medium	54.0	39.0	317.5	1886
Oats, rolled	59.4	29.5	315.2	1809
Barley, pot	31.7	3.6	362.4	1650
Beans, haricot	80.7	2.3	292.6	1552
—, butter	84.4	3.2	282.1	1532
Peas, whole				
green, dried	92.5	2.7	259.0	1467
—, split,				
yellow	92.1	3.2	285.8	1579
Lentils, split,				
red	91.2	1.8	289.8	1579
Potatoes, old	8.6	0.1	82.1	373
—, new	7.3	0.1	92.5	410
Cabbage	3.2	0.2	17.7	88
Carrot	5.4	0.4	43.6	205
Turnip	5.4	0.4	20.0	108
Tomato	3.2	0.4	20.4	101
Watercress	5.9	1.4	13.6	93
Lettuce	3.2	0.6	5.4	41
Apples	1.3	0.9	44.4	196
Lemons	0.9	0.9	4.5	31
Oranges	2.7	0.4	29.9	137

Most F.s contain, in varying proportions, the essential elements to life, proteins, carbohydrates, fats, mineral salts, water, and vitamins. Certain F.s have a much larger proportion of one constituent than another, e.g. meat supplying mostly protein and potato mostly starch. Milk, however, is a scientifically complete F., containing all the nutritive constituents to maintain life and promote growth, though the addition of some iron and vitamin C is recommended. Raw cow's milk is generally considered unsafe for human consumption owing to the possible presence of harmful bacteria. It should therefore be 'heat treated,' and this is usually done by pasteurisation. This destroys harmful organisms and some of the vitamin value. The latter may be supplemented by fresh orange juice, rose-hip syrup, etc. Milk is a F. for children and invalids; but, to provide sufficient calories for his needs, the average man would need to take about 8 pints a day and this would contain more protein and fat than is necessary, and insufficient bulk of unabsorbed matter to act as intestinal ballast.

Protein is the main constituent of protoplasm, and is essential to the body structure. It does, however, supply a limited amount of heat and so may take the place of carbohydrates; but starches, sugars, and fats can never take the place of nitrogenous F.s in building and repairing the tissues of the body. Meat, fish, cheese, milk, and eggs provide good proteins. Lean meat and milk are readily assimilated, but cheese is difficult to digest owing to its insoluble fatty matters, but grating or thoroughly chewing renders it more easily digested. Eggs are an ideal F. comparing favourably with meat and milk. They contain protein, fat, and mineral matters (particularly iron, phosphoric acid, calcium, etc.). The protein contained in egg white, however, is more easily digested when the myriad cells enclosing it are broken down by whisking or beating. Shell fish, particularly lobster and crab, are indigestible and sometimes contain certain irritant poisons. They should be eaten with caution. Oysters are easily digested but they are not very nutritious.

Carbohydrates (starches and sugars) are obtained mainly from vegetables, the most important source coming from the cereals wheat, rye, oats, maize, and rice. Green vegetables, fruits, and nuts are also a source of starch and sugar. Wheat, rye, and maize are all used in bread-making, but wheat has the highest F. value. Rice contains mostly starch, the whole grains being of better F. value than the huskless polished grains. None of these cereals is a complete F. as they are somewhat poor in fat and protein, hence the addition of milk, eggs, and butter. Sugar is of great importance as a F., and is derived from various sources, the chief being from the sugar-cane, sugar-beet, and sugar-maple; treacle, molasses, and syrup being by-products. Honey is an invert sugar (see DIET). Boiling for some time (as in home-made jam) converts white (refined) sugar into fruit sugar and renders it a more nutritious and desirable F.

Pulses (peas, beans, lentils, etc.) are a rich and economical source of protein, and are a fairly good source of carbohydrate. The soya-bean is rich in protein and fat, but contains little carbohydrate, and for this reason is used in the making of diabetic bread. It is also eaten with rice to supplement its protein deficiency; and a 'synthetic' milk can be made from the powdered bean, which is comparable to cow's milk.

Green vegetables, salads, and root vegetables are a valuable source of mineral salts and vitamins, and many (like the potato and carrot) are rich in carbohydrate. The soil in which vegetables are grown influences their nutritive value. It should be healthy and fertile, as inferior vegetables grown on poor soil are responsible for ill-health. Green vegetables particularly should be eaten only when they are quite fresh. The potato is one of the most important root vegetables, and when properly cooked (see DIET) is

a valuable source of F. Many vegetables may be grated and eaten raw with advantage, especially cabbage, sprouts, spinach, and also some root vegetables such as carrots, beetroot, etc. Young dandelion leaves are 10 times as rich in iron as other vegetables. Tomatoes are a valuable source of vitamins. Edible fungi, such as mushrooms, are not very nutritious, and when cooked are indigestible. Vegetables as a source of protein must be considered bulky and indigestible. They contain much water and cellulose and the protein is not as easily assimilated as that from animal sources. Vegetarians supplement this protein deficiency by the addition of milk, cheese, eggs, and nuts.

Fats are an important F., especially to people living in cold climates. They include all the animal fats, vegetable fats, and fish fats (*see* DIET).

Fruit is principally of value on account of its refreshing qualities, sugar, vegetable acids, salts, and vitamins. Much of value lies in the skin of some fruits, but it should always be washed before being eaten. Bananas, figs, dates, and raisins are the fruits which contain a high caloric value, and therefore supply the most energy. Nuts are rich in nitrogenous matter, but indigestible unless ground. They also contain more fat than any other vegetable.

The main constituent of every beverage is water. The chief restorative beverages are tea, coffee, and cocoa; they have a stimulative effect, but are of little nutritive value, except from any milk which is added. Alcohol taken in moderation with F. acts mainly as a digestive stimulant; it has very little actual food value. In excess it is a protoplasmic poison and anaesthetic.

Diet is the F. of an individual considered as a whole, particularly with regard to its efficiency in maintaining the nutrition of the body. *Dietetics* is the art of using the F.s required to make suitable and appetising meals. A *dietary* is an organised system of taking F., the various constituents, their amounts, and time of eating being estab. beforehand. A dietary may be estab. as part of the treatment of disease. This is particularly important in such conditions as diabetes where some constituents of ordinary F. may have a harmful effect. In obesity satisfactory weight reduction may be achieved by a knowledge of F. composition and body requirements. In institutions such as prisons and in public services such as the army and navy, dietaries are necessary if only to regulate the actions of the officials immediately concerned in the distribution of F. In prisons and other institutions the D. is dependent upon considerations of economy, efficiency, and discipline. The F. must be sufficient in quantity and nature to satisfy the physical needs of the inmates while at the same time having a degree of austerity sufficient to minimise the attraction which might be felt by individuals disinclined to work for F.

The average man requires daily 2700–2800 grms. of water, 30 grms. of salts,

70–100 grms. of protein, 30–90 grms. of fat, and 340–750 grms. of carbohydrates. Man needs about 3000 net calories a day, but feeding by the theoretic caloric value of F. presupposes perfect metabolism, whereas some F.s are incompatible with others and should not be eaten together.

Metabolism (q.v.) is the sum of all the physical and chemical processes by which living organised substance is produced and maintained, as well as the transformation of F., etc., by which energy is made available for the uses of the organism. A D. can be calculated on the basis of the amount of work a man is to perform, but normally the organism regulates automatically (by means of appetite) the quantity of F. The amount of energy obtainable from a D. will depend not only on its quantity, but also on its make-up. The heat obtainable from a given F. is called its caloric value. In 1933 a committee appointed by the Brit. Medical Association to determine the minimum D. for the maintenance of health and working capacity agreed that, as about 10 per cent of F. is undigested and passed out of the body as waste matter, the caloric value of F. as purchased should be 3300–3400 calories for a daily requirement of 3000 calories for the average man.

Vegetarianism, which has a certain number of adherents, is the practice of living upon F.s obtained exclusively from the vegetable world, and abstaining entirely from flesh F. and all F. obtained by the killing of animals. Vegetarians are usually also total abstainers from all alcoholic liquors. The average vegetarian admits into his D. such articles of F. as eggs, milk, butter, cheese, cereals, and some moderate vegetarians even eat fish. The movement took its rise about the middle of the 19th cent., and the idea was best received in England, where there are numerous vegetarian societies and restaurants. There are sev. varieties of vegetarian D., but they all have one point in common, viz., abstention from flesh F.s. In all ages there have been idealists who have advocated a vegetable D., chiefly on ethical grounds, as exemplified by Plato, Plutarch, Shelley, Rousseau, etc., but they never had any very extensive following. The arguments for and against are many. Vegetarians maintain that flesh-eating is responsible for the propagation of some of the most serious diseases, especially cancer and tuberculosis. They also contend that nature provides the means of supporting life in the best and most nutritive form by such products as nuts, seeds, roots, eggs, etc., and not in the comparatively degenerate form of flesh. Anti-vegetarians object that with a purely vegetable D., in order to obtain sufficient nourishment, an enormous amount must be consumed and that the waste products are excessive in quantity. Scientific opinion too is unfavourable to vegetarianism, it being held that the structure of man's stomach and intestines proves that nature intended him for an omnivorous animal, his digestive organs being fitted to derive nourishment from every

kind of F. The advances in the knowledge of the construction of vegetarian dietaries in recent years have been considerable, one of the greatest developments in extending the bill of fare being the manu. of nat meats. There are also many vegetable extracts useful for making soups and gravies especially prepared from grains by malting processes. Various combinations of cooked grains exist, such as shredded wheat, biscuits, and others—all satisfactory F.s. Generally speaking, however, vegetable foodstuffs are less appetising than others, and the vegetarian feeder, in consequence, is less likely to indulge in excess.

Diabetic diet. devised for patients suffering from diabetes, consists in removing from the F., as far as possible, everything which easily turns to the formation of sugar in the system, especially all excess of farinaceous F. Gluten bread, that is bread composed of wheat without starch, skim milk, cheese, eggs, meats, fresh fish, and green vegetables are prescribed, and sugars, starches, and all F.s. of an indigestible nature should be avoided. Saccharin is of great service in this D., as it supplies the flavour of sugar without its objectionable properties. As regards beverages, sweet wines, liqueurs, ale, stout, cider, and cocoa should be avoided, but brandy, whisky, burgundy, claret, aerated waters, coffee, and tea may be taken with impunity. Milk too is as a rule allowable. Generally speaking a diabetic D. involves the use of F.s rich in proteins and fat, and the abstention from those containing sugar and starch.

Banting system, for reducing obesity by means of a strict D. The effect of this particular system of D. in his own case forms the subject of an interesting 'Letter on Corpulence,' pub. in 1863 by Wm Banting (q.v.). He was 66 years of age, 5 ft 5 in. in stature, and weighed 202 lb., and by strict attention to D. managed to reduce the total amount of fat and in little more than a year lost 46 lb. of bodily weight. For breakfast he took from 4 to 5 oz. of any meat except pork; tea; and dry toast or biscuits. For dinner he took from 5 to 6 oz. of any fish except salmon; any meat except pork; any vegetable except potato; any kind of poultry or game; 2 or 3 glasses of unsweetened wine; and a small quantity of dry toast. His tea he always took without milk or sugar, and his supper was similar to dinner. He made his own case widely known by the circulation of his pamphlet, and his system was tried by numerous people and proved to be a great success. The large amount of meat, however, in this D. would be unsuitable in many cases, and such a radical change should not be adopted without medical advice, as a prolonged course might have the effect of setting up dyspepsia. Weight can now be scientifically reduced by a definite D. which satisfies the requirements of the body but contains F.s with a low calorie value.

Artificial feeding.—This occasionally

has to be resorted to in the case of disease and grave illness, when F. cannot be taken through the mouth, and when it is essential to try the artificial method, subcutaneous or intravenous.

Preparation and cooking of Food.—This has much to do with its nutritive value, and many articles which, when raw, are unfit for nourishment, become nutritious when cooked. Well-cooked F. is wholesome and appetising, while the same material badly cooked is unpalatable. Cooking serves 3 distinct purposes. It alters the physical condition and structure of the F., renders it appetising by improving the appearance and flavour, and kills by means of heat any disease germs, parasites, or such-like organisms the F. may contain. This last is a very important matter and applies to both animal and vegetable F.s. Scrupulous cleanliness should also always be observed in serving and keeping F. Every care should be taken to ensure this for the sake of health. If kept or handled under unhealthy conditions, food, and drink too, become very dangerous purveyors of disease. See COOKERY.

Food and National Health.—The continued austerity of the Brit. D. after the Second World War prompted sev. medical bodies, such as the Brit. Medical Association and the Central Council for Health Education, to review the prospects with some care. The maintenance of health since 1939, together with improvement in many mortality rates, and in height and weight records of children, suggests that the D. had been on the whole a well-balanced one. Medical opinion favours the retention of such features of the D. as have plainly helped to secure the health and stamina of the public. It seems agreed that sev. elements have acted in combination to produce the good effect. Among these are the provision of milk to special groups, the availability of fruit juices for these groups, the higher, but as yet by no means adequate, consumption of vegetables (including potatoes), and the lower consumption of sugar. It is considered further that the average D. would be improved by a somewhat higher consumption of cheese than was the pre-war habit, a higher consumption of fat fish, and a more general provision of milk and eggs. Implicit in the medical view is the realisation that a thorough educational campaign is needed to persuade the public to maintain the beneficial features of the war-time dietary.

See also ADULTERATION; COOKING; DIGESTION; FERTILISERS; HYGIENE; MANURES; NUTRITION.

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Dietetics, 1947; E. W. H. Cruickshank, *Food and Nutrition*, 1951; M. Pyke, *Manual of Nutrition*, 1954; L. J. Harris, *Vitamins in Theory and Practice*, 1955.

Food Control, British, in Wartime.—*The First World War* (1914–18).—During the first 2 years of the war gov. interest in F. was concentrated on the rations of troops rather than on the F. supply of the nation. But matters became acute in Britain about the middle of 1916, and in Oct. of that year a royal commission on wheat was set up, which soon expanded into an organisation for controlling the wheat supply of Great Britain, France, and Italy. In the same year a F. controller was appointed (Lord Devonport), and later a Ministry of Food was created. In the spring of 1917 the gov. took over the supervision of all flour mills, and the people were exhorted to ration themselves according to a certain scale. The Ger. submarine campaign was now making itself felt in connection with the supply of F., and there were signs of growing unrest among the people. At this time sugar was rationed, but the system was extended to other commodities, and brought into being numerous F. C. commissioners to administer the system. The following were some specimen rationed articles per head per week: sugar 8 oz., butter and margarine 5 or 6 oz., lard 2 oz., meat 1s. worth, bacon and ham and other meats varied amounts, jam 4 oz., cheese 2 oz., and tea 2 oz. This scheme of rationing ended the queues which had previously gathered at shops and solved the problem of F. distribution in a manner that caused little hardship. Towards the middle of the year the submarine peril was practically overcome (see VINDICTIVE; ZEERUGGE).

The Second World War (1939–45).—As in the First World War the gov. had to regard national feeding as of overriding importance, and again the problem arose as to the means of operating national C. of F.s through a centralised organisation. The circumstances in Sept. 1939 were, however, very different from those in 1914; for the gov. now had the documented experience of 1914–18 and of the application of public rationing, besides the experience of various marketing schemes under which elaborate national organisations were formed. In anticipation of war a special F. (defence plans) dept had been set up in the Board of Trade in 1936. Towards the end of 1939 the real F. problem became evident; it was not that of feeding the nation so much as that of fixing prices at levels to suit everyone, including the consumer. Meanwhile the F. (defence plans) dept had prepared commodity plans and in a report of 1937 issued a statement of general policy, including the following principles: The experience of the war (viz. 1914–18) showed that if control were to be effective in maintaining supplies and holding prices, it had to be introduced before a shortage had arisen and prices began to get out of hand; all F. should be controlled by a single authority; the F. controller should ensure that everyone

would be able to obtain a fair share of the national F. supply at a reasonable price; whenever C. had to be imposed the transition from normal trading to wartime C. should begin to take effect within a few hrs; and experience showed that if prices were to be controlled demand as well as supply must be regulated.

The Essential Commodities (Reserves) Act of 29 July 1938 estab. a fund and empowered the Board of Trade to proceed with storage of essential F. Trading interests influenced the plans to the extent of centralising C. in the first instance through the large importing and wholesale houses with subsequent application through retailers to the public. Nearly a score of F. divs. for regional application of plans were set up in Britain. F. committees estab. under the local authorities were responsible for registration of retailers, ration C. of the consumer, and licensing of local manufacturers. This was the first deviation from the principle of control through one central authority and in consequence there was some overlapping of functions. The gov. then provided for committees at all stages of handling F. on the general foundation of an independent chairman, civil servants, and trading interests. Ration books were printed to ensure the retail control of such commodities as sugar, meat, bacon and ham, butter, margarine, and cooking fats, indicating that demand control in these specified F.s was held to be essential. On 31 Aug. 1939, before the declaration of war, the gov. issued the Acquisition of Food (Excessive Quantities) Order, making it an offence for the public to buy more than one normal week's supply of F. F. C. committees appointed by local authorities were estab. under constitution orders. Requisition and control orders authorised the acquisition and C. of stocks of imported F.s and feeding stuffs and of home-produced F.s in quantities exceeding stated amounts in any stores exceeding a given capacity. Thus the first application of C. operated from the importing or large-scale wholesale end without effective check on consumer demand.

The next step was the fixing of maximum prices of most commodities under provisional orders limiting prices to the highest figures secured in ordinary market conditions before the war. A series of maximum prices orders controlled all stages from production to consumer. These allowed increases to satisfy reasonable demands of home producers and the chief trading interests, covering higher costs due to war risk insurance, freight charges, etc. The gov. held imported stocks and *pro tanto* became an early war profiteer. But on the other hand the gov. subsidised producers on condition that retail prices remained low to the consuming public.

It is fair to state that government food plans were originally intended to maintain low food prices to the public, to take powers to fix maximum prices at all stages, to rationalise transport, and to

pool supplies, and so were theoretically means towards complete nationalisation of food supplies. Price levels were to be advanced only in response to proved increases of cost. In spite of all previous experience, however, the gov., generally too late to anticipate price advances, tried to legalise higher price levels, whilst warning interested parties of the dangers of exceeding maximum C. prices. For a well-reasoned statement of the problems involved in feeding the nation in peacetime and wartime see G. Waiworth, *Feeding the Nation in Peace and War*, 1940.

The war brought about a considerable tightening in the supply situation: in the case of the U.K. this was caused chiefly by the necessity of husbanding shipping space required for imports; while in the case of Sweden and Switzerland the continental blockade reduced imports to a fraction of peacetime requirements. Nevertheless in spite of these difficulties the overall situation was less strained than on the Ger.-dominated Continent, and left room for more flexible systems of rationing than in Germany. The good supply of bread and potatoes meant that each individual had the opportunity—as distinct from the totally rationed pops. on the Continent—to consume as many calories as his individual requirements indicated. While the purpose was to maintain a diet adequate in all essential nutritive elements, this end could only be achieved with the greatest economy of means, and F.s requiring more shipping space, land, and labour were reduced in favour of those requiring less. Rationing was concerned mainly with protein F.s, milk and fats. The need for these F.s varies less between different groups than does the need for other nutritive elements, and it was found possible to adopt a system of relatively undifferentiated individual rations. Nevertheless it was recognised that an overall *per capita* rationing was not capable of taking into account all special nutritional needs, which were then met by various schemes superimposed, as it were, on the basic system. The most important of these schemes were communal feeding and schemes for the distribution of protective F.s, namely milk, eggs, and certain fruit and fruit juices, for which special ration cards were given. The best known and most important of these schemes related to milk. In addition children received through welfare and maternity clinics quantities of fish liver oil and fruit juices. A third scheme was the use of 'points rationing.' Each consumer received a card containing a certain number of points, and the commodities were 'priced' not only in ordinary currency but also in points. For sev. years after the war tinned meat, tinned fish and beans, for instance, were under point rationing. The system rendered it possible to include or exclude F.s as the situation demanded, and through the double mechanism of price and point changes demand could be steered in the direction desired. At the time the system left a considerable

degree of choice to the consumer. (Consult *Food Rationing and Supply, 1943-44*, issued by the Economic, Financial and Transit Dept. of the League of Nations, Geneva, 1944.)

In contrast with the First World War, when profiteering in produce was found to be a constant evil, the gov., by combining excess profits tax with price control, largely prevented profit from war. See R. J. Hammond, *Food* (H.M.S.O.), vol. 1, 1951, vol. II, 1956.

Food Council. The prices of F. remained at a high level for some years after the First World War had ended, and there were frequent complaints that traders were demanding unjust prices. The result was that a royal commission was appointed to investigate these complaints, and after its report in April 1925 a F. C. was set up in July of that year which consisted of 12 members, under the presidency of Lord Bradbury. The C. from the first was a somewhat impotent body. However, the Weights and Measures Act, 1926, resulted from its activities.

Food-poisoning. The term generally refers to outbreaks of acute illness—pain, vomiting, and diarrhoea—which occur shortly after a meal. F. is caused principally by the contamination of food by bacteria which multiply rapidly under suitable conditions. Fifty per cent of cases are caused by bacteria of the *Salmonella* group, which get into the food from animal or human excreta. *Salmonella* F. is characterised by sickness, diarrhoea, and fever, developing within 24 hrs; attacks may last for from 1 to 3 days.

Certain strains of the *Staphylococcus* produce a toxin within the intestine which causes a violent attack from 2 to 6 hrs after eating infected food and lasting from 12 to 24 hrs. The majority of cases are caused by nasal carriers.

Miscellaneous bacteria that are resistant to cooking temps. may grow in stored cooked food and cause mild attacks of abdominal pain with diarrhoea but no vomiting.

Botulism is due to the growth of an anaerobic organism, *Clostridium botulinum*, the spores of which are very heat-resistant. The toxin attacks the central nervous system. In Europe, where cases are caused mainly by eating contaminated meat or fish, the mortality rate is about 25 per cent; in the U.S.A. cases most frequently follow the ingestion of home-canned vegetables or fruit; here the death rate is about 70 per cent.

Some poisoning may be caused by chemicals such as arsenic, used as weed-killers or insecticide sprays on fruit and vegetables.

The extension of communal feeding in recent years has led to a marked increase in the incidence of F. Another cause is the increased sale of ready-prepared foods. Foods liable to carry infection include cooked meats, sausages, soups and stews, trifles, cream buns, meat pies, fish-cakes, duck eggs, and shellfish. Lack of personal hygiene among those who handle and prepare food is the major cause of

infection. Bacteria from the intestines, nose and throat, or from septic cuts, may be conveyed via the hands. Animals such as mice, rats, cats, dogs, flies, cockroaches, etc., may also be a source of infection. Once food has been infected, keeping it at a heat near body temp. will cause a rapid increase in the growth of the bacteria.

Prevention. necessitates (1) strict control of foods for sale, to avoid infected food being made available on the market; (2) cleanliness in the distribution of food; (3) high standards of hygiene among those handling food and in places where cooked food is prepared and served. High temps. destroy bacteria; clean storage and refrigeration prevent their growth. See G. M. Diack, *Food-poisoning*, 1950; Betty Hobbs, *Food-poisoning and Hygiene*, 1953.

Fool, see JESTER.

Fools, Feast of (Lat. *festum fatuorum*, *stultorum*, or sometimes *astrorum*), grotesque masquerade or medieval merry-making, taking place more particularly on Holy Innocents' Day (28 Dec.), but extending more or less over the whole period between Christmas and Epiphany. Probably a survival of the old Rom. Saturnalia, it crept into the ceremonial of the Christian Church in spite of the fierce anathemas of fathers and councils, and even after the Protestant Reformation an observance of it was kept at Antibes as late as 1844. The festival apparently originated in France, and was first mentioned by J. Beleth (12th cent.). The aim professed was to interest people in the story of Christmas, but the boisterous drollery soon degenerated into profanity. Usually the donkey played a leading part in the pageant. Mock popes, cardinals, and bishops were elected with ridiculous titles, and the most sacred Christian rites were travestied. See Du Tillot, *Mémoires pour servir à l'histoire de la fête des Fous*, 1741; Schneegans in Müller's *Zeitschrift für deutsche Kulturgeschichte*, 1858.

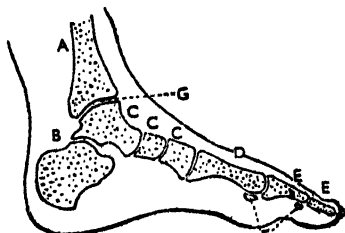
Fools' Day, April (or All), 1 April, observed (up to 12 noon in Britain) as a day of practical joking. It is of almost universal origin, and connected probably with the spring equinox. India observes 31 Mar. in this way. The custom of sending people on fools' errands, thus making April fools of them, may have reached England from the Continent in the 18th cent. An A. fool is called *Aprilennarr* in Germany, *Poisson d'Avril* in France, and *April Gouk* (cuckoo) in Scotland. The custom has been given a Christian derivation from the sending to and fro of Christ from Annas, to Calaphas, to Pilate, and to Herod, which was made a feature of some medieval passion plays, but its pagan origin seems certain.

Foolsap, see PAPER.

Foot (length), see METROLOGY.

Foot. In the human F. the bones are 26 in number, arranged in 3 groups, viz. the tarsal, or hindmost bones, the metatarsal, and the phalanges of the toes. The weight of the F. is borne on 3 distinct

points; the heel, the point where the big toe joins the first metatarsal bone, and a similar point at the base of the little toe. The elasticity of the F. is greatest in the longitudinal arch. The F. is also arched transversely so that normally the heads of the 1st and 5th metatarsal bones only bear weight. The bones of the F. are all held together by short ligamentous bands of great strength. In the condition known as flat F. (q.v.), or pesplanus, these ligaments become lax and stretched.



LONGITUDINAL SECTION THROUGH THE FOOT IN THE LINE OF THE BIG TOE

A, tibia; B, bone of the heel; C, tarsal; D, metatarsal; E, phalanges; F, sesamoid bone; G, ankle joint

Foot and Mouth Disease, eruptive-febrile D. of cloven footed animals and swine. Hedgehogs may also be affected, and, more rarely, human beings. It is caused by a virus, so small that it will pass through a fine bacterial filter. The disease is characterised by 'blisters' which form in the mouth and on the feet and udder. Symptoms may vary with outbreaks, the type of virus responsible, and the species of animal affected. In sheep and pigs, mouth lesions may not be obvious. The virus is present in liquid from 'blisters' and may live in the bone marrow of infected animal carcasses for long periods—especially in frozen meat. Not infrequently outbreaks in Britain are due to infection from imported meat. Contaminated packing straw and similar materials may carry the infection. It is a notifiable D. under the Diseases of Animals Act, and all infected and contact animals are slaughtered and the owners compensated in order to stamp out the infection. The slaughter policy, although often criticised, is economically sound and all progressive countries adopt it when conditions allow. Contrary to popular notions, treatment is relatively easy and recovery rates fairly high in those countries where the disease is endemic, but the overall losses are substantial and considerably in excess of the cost incurred by those countries where the radical stamping-out policy is practicable. Britain leads the world in research and in the typing of the virus involved. Vaccination against the D. is practised abroad, but is only of limited use owing to the

variations in type of the causal virus and the fact that it is not possible to prepare a single vaccine which will give universal immunity. Moreover, vaccination may, by masking the infection, favour the undetected spread of the D.

Foot Guards, select regiments, the 'flower of the Brit. Infantry,' including Grenadier (2 battalions), Coldstream (2 battalions), and Scots G. (2 battalions), the Irish G. (1 battalion), and the Welsh G. (1 battalion). See **HOUSEHOLD TROOPS** and under the names of the sev. regiments. See Sir H. L. Aubrey Fletcher, *A History of the Foot Guards*, 1927.

Foot-pound, see **MECHANICS**; **METROLOGY**.

Football, game in which 2 teams of players play with a ball. There are 2 main codes of F. in this country, Rugby and Association; the former allows the ball to be carried as well as kicked, whilst in the latter game handling is prohibited, except by the goalkeeper. The affairs of the Association game are in the hands of the F. Association (F.A.), whilst the Rugby Union controls those of the handling code. Sev. public schools, such as Eton, Harrow, and Winchester, play varieties of F. peculiar to themselves. The game as played in the U.S.A. is now very different from the Rugby Union game on which it was modelled. From the earliest times games with a ball were probably in vogue, and we have record of some amongst both the Greeks and Romans. The Greeks had a game which consisted simply in throwing the ball from one person to another, another game (*aporrhas*) in which the ball was struck with the palm of the hand on to the ground as often as possible, and one called *thaeninda*, in which the players threw from one to another, with tricks and feints. None of these games had so much in common with F. proper as the Gk *episkuros* and the Lat. *harpastum*, the latter of which was in all probability the precursor of Eng. F. Pollux describes the latter as a game in which the players, divided into 2 bands, strove to carry the ball over 2 lines. There is no historical evidence to show that the Romans actually introduced *harpastum* into Great Britain, but the probability is that they did so. There is no doubt, whatever the precise origin of the game, that it was known at a very early time in England. Its name occurs before that of any other athletic sport which is popular at the present day. W. Fitzstephen, in his *History of London*, c. 1175, speaks of the young men of the city annually going into the fields after dinner to play at the well-known game of ball on the day *quae dicitur Carnilevaria*, and as far as is known this is the earliest definite mention of F. in England. It is notable that Shrove Tuesday seems to have been the day on which more than all others F. was played, and the custom of a rough and tumble game on that day survives in some parts of the country. At Derby, for instance, all the able-bodied men in the pars. of St Peter's and All Saints took part in the contest. The game began in the

market-place, a large ball being tossed up in the middle of the bands. The goals in such games were at opposite ends of the tn, and nothing stopped the players, who took the ball through water if necessary, and recked nothing of broken heads, torn clothing, and such details. This is also an ann. event at Atherstone (Warwickshire). Such ball-play was popular also among the anct Scots, for we find the Shrovetide game at Scoone, in the co. of Perth, described by Sir F. M. Eden, in his *Statistical Account of Scotland*. A feature of these games was their length, as they lasted in most cases for the major portion of a day. Fitzstephen, writing in the 12th cent., says that 'the boys annually on Shrove Tuesday play at the well-known game of ball.' Many further proofs of the popularity of F. among the anct residents of the country are forthcoming. In many of the games every able-bodied man was compelled to take part in the contest; the day was made a general holiday, and any player who was fortunate enough to ground the ball in goal was a popular hero. In all these early contests the element of danger both to life, limb, and property was considerable, and sev. proclamations were issued at various times forbidding it. Edward II, as a result of a petition of the citizens of London, issued a proclamation on 13 April 1314 commanding and forbidding the game to be played in the city in future, 'as many evils may arise, which God forbid.' In 1349 Edward III pub. a proclamation against F. and in favour of archery; similar writs to that then issued at London were sent to the sheriffs throughout England. In the time of Henry IV, AD 1410, we find F. prohibited in Normandy, described among the *jeux importunes*, and again in the statute 12 Richard II c. 6. James III of Scotland ordered in 1447 that 'football, and golfe, be utterly cryed down and not to be used,' and a royal proclamation was made in England in 1491 against the same 2 sports. F. was by no means stopped by these prohibitions, being played to a very great extent in the reign of Elizabeth. There were still no set rules for the conduct of the game, and no referees or umpires; consequently the number of accidents was large, and some of them were fatal. Proclamations continued to be issued against the sport, as in 1572 and 1581. In the 17th cent. various names appear to have been given to it; in Cornwall it was called hurling, and in the E. cos. camping or camp ball. An exception to the rule of hostility to F. among kings was furnished by Charles II, who made a match at F. between his own servants and those of the duke of Albemarle in 1681. During these times there was practically no opportunity for the working classes to indulge their liking for F. save on Sundays, as there was no Saturday half-holiday then. This desecration of the sabbath naturally provoked the wrath of the religious people of the time, as is forcibly expressed by P. Stubbes in *The Anatomy of Abuses in the Realm of England*, 1583. Towards the end of the 18th cent. F. waned in

popularity, and between 1820 and 1840 it was hardly ever played. But it survived. The reason for its survival must be looked for in the public schools, which each had a game peculiar to itself in many respects. The prin. features of these games will be dealt with later, but the natural wish of the old boys of public schools to continue playing was primarily responsible for the revival of the game and the development of Association F.

The first attempts to originate a code of rules to enable old boys to play together was made at Cambridge Univ. in 1846.

relegation, fixtures, transfer of players, and other domestic matters. In co-operation with the F. Association and the Players' Union, constant watch is kept on all affairs concerning the welfare of players—registration, transfers, wages, benefits, etc.

Similar associations govern the game in Scotland, Ireland, and Wales. The Scottish League is organised on similar lines to the F. League in England.

All 4 home associations are affiliated to the Fédération Internationale de Football Association, whose H.Q. are in



Sport and General

ASSOCIATION FOOTBALL

Arsenal v. Wolverhampton Wanderers at Highbury

Between that date and 1863, the date of the formation of the F. Association, sundry unsuccessful attempts were made to reduce the numerous school rules to one satisfactory code. In 1855 the Sheffield club was formed, in 1857 the Hallam club, and in 1859 the Forest F. club, afterwards the famous 'Wanderers.' In 1863 the F. Association was started, and has gradually assumed control of the Association game or 'soccer,' over which it is now the supreme authority in this country and the Brit. Commonwealth.

The F. League, consisting of 92 clubs, controls the prin. professional matches in the country. The clubs are divided into 4 divs., First, Second, Third North, and Third South. The F. League send 8 representatives to the F. Association Council. Its Management Committee deals with all questions of promotion and

Switzerland. Over 80 national associations are affiliated to this organisation, which frames statutes and regulations for the control of the game's affairs throughout its member associations. The Laws of the Game, however, are the concern of the International Board, consisting of 2 members of each of the F.A., the Scottish F.A., the F.A. of Wales, and the Irish F.A., together with 2 representatives from F.I.F.A., to speak for the remainder of the associations. It requires a 4 to 1 majority of the members of the International Board before any alteration in the Laws of the Game come into force. It is, therefore, almost entirely in the hands of the U.K. associations as to whether or not any alterations are made.

There are many smaller professional leagues operating in England; perhaps the best known are the Southern League, the

F. Combination, the Central League, the Midland League, the Western League, the Lancs Combination, the North-Eastern League, the Birmingham Combination, the Eastern Counties League, and the Kent League.

Amateur F. flourishes more particularly in the S. There are hundreds of amateur leagues throughout the country occupying the attention of some 25,000 amateur clubs. Well-known amateur leagues include the Isthmian, Athenian, Corinthian, and the Spartan Leagues. Possibly the best known of all amateur clubs in England was the Corinthians, who amalgamated with the Casuals in 1938; but in recent years Bishop Auckland and Pegasus have taken over this rôle. In 1895 the England team that met Wales was composed entirely of Corinthians. Their first tour was in South Africa in 1897, and few clubs have done more to popularise the amateur game. Their name used to attract players from all over the country, although it has been said that the 1938 fusion was not a success. Another famous amateur club is Queen's Park, who compete in the Scottish League.

In the early years of the game there were naturally many changes in the laws. Until 1869 handling the ball was permitted under certain conditions, but in that year the practice was abolished. The game is played with 11 men on each side, the formation being 5 forwards, 3 half-backs, 2 full-backs, and a goal-keeper. The field of play is 120 yds by 80 yds (full-size). The goal posts are 8 yds apart; the goal area is a space 20 yds by 6 yds in front of the goal, and the penalty area is a space 44 yds by 18 yds in front of the goal. When a player handles the ball or commits a foul inside the penalty area, the opposing team is awarded a penalty kick. The ball is placed on a spot 12 yds from the goal, no player being allowed to stand between the ball and the goal-keeper. The penalty kicker endeavours to place the ball between the posts, only the goal-keeper being allowed to intercept the ball. The ball is kicked off at the beginning of each half period and after each goal, by the centre-forward in the centre of the field within the kick-off circle, 20 yds in diameter. The ball is round, leather-covered, weighing 14-16 oz and 27-28 in. in circumference. A goal is scored when the ball is kicked or headed between the goal-posts and under the horizontal bar. A goal may be scored from a free kick. The referee is assisted by 2 linesmen, who watch particularly when the ball goes into touch, and advise the referee when so asked. The referee has power to send off any player guilty of violent and ungentlemanly conduct, and his decision in all matters is final.

The F. Association organises the F.A. Challenge Cup Competition, the greatest F. competition in the world; the Amateur Cup Competition, the F.A. County Youth Challenge Cup Competition, and the F.A. Youth Challenge Cup Competition. The F.A. Challenge Cup Competition was instituted in 1871, and in the

first years only very few teams competed for it, but their number has gradually grown, until now the first qualifying round for the trophy is played off in the first month of the season. The Scottish Cup was started 2 years later, and Ireland and Wales now have similar cups. Owing to the greater skill of professional footballers, the F.A. Cup is practically a competition for such teams, as no amateur club of recent years has survived longer than the first round of the competition proper. The present F.A. Cup is a modern vase; the original was stolen from a shop window in Birmingham in 1895 while Aston Villa were the holders.

The cup is open to all clubs in the country. By a series of preliminary rounds, however, the vast number of entries are whittled down to the first round proper, when the F. League clubs join in. The same principle applies to the Scottish, Irish, and Welsh Cups, entries being confined to the applicable countries.

Fourteen Welsh clubs participate in the F.A. Cup.

The popularity of the game is now universal and the standard of play in many European and South Amer. countries is equal to, and in some instances better than, that of Brit. teams. In 1953 England lost an unbeaten home record in international matches when Hungary won at Wembley by 6 goals to 3. During the following year further severe set-backs in Budapest and Belgrade against Hungary and Yugoslavia, and in the World Cup (when Germany were the ultimate winners) demonstrated the great progress made on the Continent and the apparent elimination of Brit. dominance. However, there has been a steady improvement in the years 1955 and 1956 and England is once again reckoned to be one of the world's leading F. countries.

The World Cup Competition is staged every 4 years, when 16 countries take part in the final. Eliminating matches are played beforehand. The next final series will be held in Sweden in 1958.

Rugby Union Football, or *Rugger* as it is generally termed, in contradistinction to 'soccer', is governed by the Rugby Union which was founded in 1871 by a group of clubs in the London area. Its origin is attributed to Wm Webb Ellis of Rugby School who 'with a fine disregard for the rules of football as played in his time, first took the ball in his arms and ran with it, A.D. 1823' (commemorative tablet in Rugby School Close). Many members of the Union are clubs associated with schools, univs., and the armed services. The laws of Rugby Union F. have been recodified and altered from time to time by the International Board, founded 1890. The ball used is oval in shape and composed of the same materials as an Association ball; its length is from 11 to 11½ in.; its circumference, measured lengthwise, 30 to 31 in.; measured over the width, 25½ to 26 in.; and its weight at the beginning of a game is between 13 and 14½ oz. The score is made by means of tries and goals. A try is scored when the

ball is touched down by one of the attacking side behind the opponents' goal-line. A goal is scored when the ball is kicked over the crossbar and between the uprights of the opponents' goal. The width of the goal is 18 ft 6 in., and the height of the crossbar is 10 ft; the uprights extend for over a foot above the crossbar, and the ball may pass between them at any height. The field of play is not more than 75 yds by 110 yds; lines are drawn parallel with the goal-lines at a distance of 25 yds out, these being known as the 'twenty-fives.' A goal may be scored in 4 different ways: (1) When a try is scored the ball is brought out any

kick-off or goal is decided by tossing, and the kick-off is made from the centre of the half-way line. Any player who is onside may run or kick directly after the kick-off. A player is offside if he gets in front of the ball during a scrimmage (this applies especially to the halves), or if the ball has been kicked or is being run with by one of his own side who is behind him; when an opponent has kicked or touched the ball, or when one of his own side, with the ball, or the kicker of the ball has run in front of him, the player is onside again. The ball must not be passed forward, or 'knocked on.' When a player is fairly tackled by an opponent he must at once



Sport and General

RUGBY UNION FOOTBALL

The Hospitals Cup, Semi-final. St. Mary's Hospital v. London Hospital at the Richmond Athletic ground

distance desired from the place where it was 'touched down' at right angles to the goal line, and a place kick is taken. If this results in a goal, 2 points are added to the 3 already gained for a try. (2) A dropped goal is a goal from a drop-kick, which is a kick where the player drops the ball on the ground and kicks it immediately on the half volley. It counts 3 points. (3) When a player catches the ball from a kick by the opposing side he may, instead of running with it, strike his heel into the ground and claim a mark. A free kick may then be taken, and if a goal results it counts 3 points. (4) A penalty goal is a goal scored from a place kick which has been given as a penalty against the opposing team for some breach of the rules, and counts 3 points. A team consists of 1 full-back, 4 three-quarter backs, 2 half-backs, and 8 forwards. Eighty mins., 40 in each half, is the usual time played, but 35 mins. each way can be arranged by the captains. The choice of

drop the ball, which is then played with the foot (it must not be at once picked up). A 'scrum' consists of the opposing forwards packing in 2 phalanxes, generally 3, in the first row, then 2, then 3 again, and shoving. The ball is put into the scrum by the 'scrum half' of the side which did not commit the breach of the rules causing the scrum, and must be 'heeled out' as quickly as possible by the forwards to the rear, where the half is waiting for it. Offences which are punished by free kicks are handling the ball in the scrum, 'feet up' in the scrum; tripping, and impeding, and tackling an opponent who has not got the ball. The most common offences are passing forward, knocking on, and offside. If the ball is kicked into touch it is thrown in by the side which did not kick it in; if carried into touch, by the side carrying it. A 'line out' is formed when the ball has gone into touch; the player who throws the ball in must throw it so that it alights

on a line at right angles to the touch line, or a scrum is held where it deviated from the straight line. When a player has crossed the touch in goal-line, after a player has touched the ball down behind his own goal, and after an ineffectual attempt to place a goal from a try has been made, the ball is dead. If, however, a player carries the ball over his own goal-line and then touches down, a scrum is held 5 yds out from the goal-line, opposite where he touched down. In the cases where the ball is dead a drop-kick or punt is taken by the defending side from their '25'; all the men of the side must be behind the man who takes the kick, or they are offside. A referee is in charge of the game, assisted by 2 touch judges with flags, which they hold up where the ball goes into touch; they also assist the referee in judging goals. No professionalism is allowed in Rugby Union F., a rule that led in 1893 to the formation of the Northern Union, renamed the Rugby League (see below) in 1922. The game has grown considerably in the last few years, Rugby Union F. being played all over the world. Many schools have changed to Rugby Union F. Competitive interests centre in the International Championship (England, Ireland, Scotland, Wales, France); the Co. Championship; the Service matches, the big club matches, and the fixtures with famous touring sides such as the All Blacks (New Zealand), the Springboks (South Africa), and the Wallabies (Australia). The H.Q. of the Rugby F. Union is at Twickenham, Middx.

Rugby League.—This 13-a-side game is played by both professionals and amateurs and has much in common with Rugby Union F., from which the League 'broke away' in 1895. The changes which have been made in the laws of the game since then have produced a more open, spectacular type of play. Rugby League is popular in Lancs, Yorks, and Cumberland, where it is organised on a competitive basis. Only occasional matches, e.g. the cup final which is played each year at Wembley, are played outside these areas in this country. Rugby League is widely played in Australia, New Zealand, and France.

Gaelic Football.—F. of one form or another was popular in Ireland for 300 years from 1600, when it was first mentioned in records of the pastime of the period. The old game was called 'caid' in Kerry and was a communal game in which the ball was carried as in Rugby. It was an Irishman, Ellis, who first 'carried' the ball when at school in England, and his style of play was adopted. Cross-country, inter-par. games were common before the Gaelic Athletic Association estab. the game in its present form in 1884. It is now popular in every one of the 32 Irish cos.; all enter for the prin. competitions—championship of co., prov., and All-Ireland National Leagues, the railway cups, etc. The pitch is 140 to 160 yds in length, and 84 to 100 yds in breadth. The spherical ball is 27 to 29 in. in circumference and must weigh between

13 to 15 oz. In the scoring area goal-posts are 7 yds apart and 16 ft high with a crossbar 8 ft from the ground; a goal counts 3 points if under the bar and 1 point if over the bar. Teams are 15 a side. Duration of play is 30 mins. in each half. The ball can be caught in the air but must not be carried more than 4 yds before being kicked or punched, but not thrown or hit with the open palm. All tripping, holding, jumping, butting, and charging from behind are prohibited. The ball on the ground must not be touched with the hand but may be lifted by the foot into the hand. Accurate catching at all heights or angles is essential; accurate lengthy kicking, punch or drop-kicking, and accurate passing with hard straight shots at goal are features of the game. Gaelic F. is unlike any other form of F. though Australian F. is very similar. Between first-class sides, the game is fast, attractive, and continuous—interest is constant for the game continues unbroken from score to score.

Australian Football.—Devised in Victoria in the 1860's and embodying features of Gaelic F., this is the most popular code in the 5 S. Australian states, a grand final in Melbourne attracting up to 90,000 spectators. In New South Wales and Queensland rugby F. is more popular. The ground is oval, areas being 150–200 yds between goals and 120–170 yds across the centre; the ball is ovoid, like a rugby ball, and weighs 16–17 oz. At either end of the field are 4 posts, each 7 yds apart; the 2 central posts are the goal-posts and the 2 outer posts are 'behind' posts. There are no crossbars. When the ball passes between the goal-posts, 6 points are scored for a goal; when it passes between a goal-post and a behind post, 1 point is scored for a 'behind.' Teams are 18 a side plus 2 reserves, 15 players being in fixed positions in lines of 3 (backs, half-backs, centres, half-forwards, and forwards) and the remaining 3 being followers; duration of play is 4 quarters of 25 mins. There is no 'off-side,' and long kicking, accurate passing, shepherding, and high-marking duels are features. The ball may be kicked or punched but not thrown nor carried more than 10 yds without bouncing. Bumping and tackling around the waist are allowed, and the ball must be passed on if the possessor is held, hence the game is kept fast and open. Excessive man-handling, tripping, charging, and pushing from behind are barred. Free kicks are awarded for marks and against infringements.

The Eton games.—There are 2 separate varieties of F. played at Eton, the wall game and the field game. The former game is played by only a small proportion of the boys, but is interesting for its peculiarities. The ground is bounded on one side by a wall about 9 ft high and 120 yds long; on the other side by a line drawn parallel to the wall at a distance of 6 yds from it. Another wall containing a door runs at right angles to the wall, and at the other end of the ground is a large

elm; the door and a chalked space on the trunk of the tree form the 2 goals. Scoring is by shies and goals, one of which outweighs any number of shies.

The field game is more generally played at Eton. The ground is 150 yds by 100 yds, and goals 12 ft in width and 6 ft high. Eleven players form a side, divided up into 8 forwards and 3 behinds. The game is begun by a 'bully' in the centre of the field. Four players form the bully; just outside the bully on each side is a corner, and an 'extra corner' on one side, whilst just behind is the 'flying man'; then comes the 'short behind,' the 'long behind,' and the 'goals.'

The *Harrow game* is played with a ball which resembles a church hassock in shape, flattened at the sides and irregularly circular elsewhere. The ground is about 150 yds by 100 yds. Two upright poles without any crossbar, 18 ft apart, mark the goals. A goal is scored by kicking the ball between them at any height. Any number of players may form a team; in matches the number is 11.

The *Winchester game* is played with a ball slightly smaller and lighter than an Association ball. The ground is 80 yds by 25 yds. A net runs along each of the long sides to a height of 10 ft, and a line of stakes and ropes 1 yd inside the net. This enclosed space is called under ropes. A furrow, called 'worms,' is marked on each short side. A goal is scored by kicking across worms, but the ball must not touch ropes, stakes, or nets, or an opponent.

American football.—From colonial times until 1871 a kind of Association F. was played by the colleges in the U.S.A. The first formal F. game was the Rutgers-Princeton game in 1869, but Amer. F. as played to-day really dates back to 1873, when Columbia, Princeton, Yale, and Rutgers adopted a set of rules, and in 1880 the uniform adoption of 11 men to each side was secured. An ann. convention was appointed to modify the rules as required, but the game became so rough that at one time the authorities forbade the matches between Harvard and Yale. The National Collegiate Athletic Association now is responsible for the laws of the game, which is now less rough and more scientific. The teams are composed of 11 men, and substitutes are allowed. The ground is 360 ft long by 160 ft wide. At each end of the ground, extending 30 ft behind the goal line to end line, is the end zone, where the scoring takes place. The area between the 2 goal lines (300 ft) is the field of play, and is divided with lines parallel to the goals every 5 yds. The goal-posts, consisting of 2 uprights more than 20 ft high, 18 ft 6 in. apart, and joined by a crossbar at a height of 10 ft are in the middle of each end line. The ball has the general appearance of an Eng. rugby ball, but is thinner and more pointed. There are 7 forwards or 'line-men' (2 guards, 2 tackles, 2 ends, and a centre) and 4 backs (a quarter-back, 2 half-backs, and a full-back). A touch-down (an Eng. rugby try) is 6 points

with 1 point scored for the conversion after the touch-down, a goal kick from the field 3 points, and 'safety' (a rugby touch-down) 2 points. The side with most points at the end of the 4 15-min. periods of play is the winner. At the half-way mark there is a 15-min. rest. The ball is kicked off from the kicking team's 40-yd line, and the teams then try to get it across the opposing goal line by carrying or passing. A man is offside as in Eng. rugby, but is put onside when the ball strikes the ground. In order to prevent blocks it was enacted that 10 yds must be made by one side in 4 successive plays or 'downs,' i.e. the man with the ball being stopped by a member of the opposing team. A great feature of Amer. F. is the 'interference' which is allowed; the games resolves itself into a series of 'scrimmages' interspersed with kicks and runs. Each man faces his opponent in the scrimmage, and thus a kind of man to man contest is continually going on. A ball going out of play along the sidelines is put in play again by a scrimmage. Another feature is the 'shift,' a tactical manoeuvre entailing a sudden change of formation; various shifts have been developed but were regulated by rules after 1922. There was little professionalism in Amer. F. until after the First World War; in 1957 there were 2 major professional leagues, the rules in these differing slightly from those used in college F.

See M. Shearman and J. E. Vincent, *Football, its History for Five Centuries*, 1885; A. M. Weyand, *American Football*, 1926; H. B. T. Wakelam, *Rugby Football*, 1935; F. N. S. Creek, *Association Football*, 1937; W. G. Killinger, *Football (Amer.)*, 1938; and E. H. Sewell, *Rugger, the Man's Game*, 1947; O. L. Owen, *The History of the Rugby Football Union*, 1955.

Foots, Samuel (1720-77), actor and dramatist. After squandering his patrimony, he went on the stage, making his first appearance in a small part in *Othello* at the Haymarket in 1744. He at once achieved some success, and later became a fashionable actor, and was highly regarded by the public of his day. Occasionally he gave entertainments, in which he was able to exhibit his powers of mimicry, which were very considerable. He wrote many plays, some of which were once highly regarded. More than once the censor interfered with his productions, and he was forbidden to play his *Trip to Calais*, in which he lampooned the bigamous duchess of Kingston. A clever man and a brilliant conversationalist, he was much sought, but his selfishness and unscrupulousness left him almost friendless. He lost a leg as a result of a practical joke played on him, and as compensation was given a royal charter for the Haymarket Theatre. He continued to act with only one leg. There is a biography by Wm Cooke, 1805. See also Boswell's *Life of Johnson*.

Footpaths, and Preservation of. F. are for the use of pedestrians (foot-passengers) only, as opposed to highways for vehicles

or horses. The Commons, Open Spaces, and Footpaths Preservation Society (formed 1899 by amalgamation of the National Footpath Preservation Society with the Commons Preservation Society) aims at preserving F., bridle-paths, and other rights of way. It serves to guard public rights to common land, roadside waste, vil. greens, and all open spaces of the kind. London offices are at 71 Eccleston Square, Westminster. Scotland has a similar Scottish Rights of Way and Recreation Society Ltd.

Plans for giving to the public new rights of access to mts, moors, and other uncultivated land, and for creating new rights of way and defining and maintaining old ones, are outlined in the report of the Special Committee on Footpaths and Access to the Countryside (under the chairmanship of Sir Arthur Hobbhouse), which was appointed by the National Parks Committee in July 1946 at the request of the minister of tn and country planning. The report (pub. as Cmd. 7207 in 1947) strongly recommends (*inter alia*) such schemes as the proposed Pennine Way, along which, according to a preliminary survey, 180 m. of F. already exist, and the reopening of the old coast-guards' path as a right of way for walkers round the whole coastline of England and Wales, except where building makes this impossible, and in such cases as the latter detours should be provided. Other long-distance F. recommended are Chilterns to the Devon coast (about 200 m., requiring about 60 m. of new F. from the Gog Magog Hills, near Cambridge, to Seaton Bay); the Pilgrims' Way (Canterbury to Winchester, about 120 m., requiring about 50 m. of new F.); the S. Downs to Salisbury Plain (from Beachy Head to Winchester, about 70 m., requiring about 25 m. of new F.); Offa's Dyke (Prestatyn to the Wye near Chepstow, roughly 150 m., requiring perhaps 50 m. of new F.); the Thames (Teddington to Cricklade via the towpaths, about 136 m.). The report recognised a national element in the demand for long-distance routes, and recommended that the National Parks Commission (see NATIONAL PARKS) should be empowered to make grants to local planning authorities for the creation or improvement of long-distance and coastal F. The recommendations of the report were largely implemented by the National Parks and Access to the Countryside Act, 1949. This act also requires local authorities to prepare maps delineating F., bridleways, and certain other highways. Interested parties (e.g. landowners or the Ramblers' Association) may lodge objections to the inclusion of new F. on the maps or the closing of existing ones. Local authorities have powers to create new public rights of way. The minister of housing and local gov. may, in certain circumstances, make orders for the diversion or closure of public F. See Sir L. Chubb and R. Glen, *Maintenance of Public Footpaths*, 1932; Hutchins, *The National Parks and Access to the Countryside Act, 1949*, 1950.

Footpaths and Rights of Way. Public rights of passage exist in many country places for walkers across fields and moors and through woodlands, etc., and some ('bridle-paths') may also be used by horse-riders. Such ways may fall into disuse or be wrongfully obstructed or closed, to the public loss; the Commons, Open Spaces and Footpaths Preservation Society (11 King's Bench Walk, London, E.C.1) is watchful to maintain them. There is a similar society for Scotland. New rights of way were recommended in the *Report of the Special Committee on Footpaths and Access to the Countryside*, 1947, and may be created under the National Parks and Access to the Countryside Act, 1949 (see NATIONAL PARKS). By proper legal procedure public rights of way may be diverted, but never without public notice. See L. Chubb and R. Glen, *Maintenance of Public Footpaths*, 1932; and pubs. of the Society named.

Footscray, busy manufacturing suburb of Melbourne (4 m. E. of F.), in Victoria, Australia, on the Saltwater R. It is noted for its bluestone quarries. Pop. 20,000.

Footwear, see BOOTS AND SHOES.

F.O.R. Abbreviation for 'free on rail,' denoting in contracts for the sale of goods that the cost of carriage and handling the goods and putting them on the railway, but not the cost of the railway freight, must be paid by the seller.

Forage Crops, see FATTENING FOODS.

Foraminifera, marine protozoans with calcareous, siliceous, or agglutinated skeletons. They are adapted to all aquatic habitats, and include bottom-dwelling and planktonic forms. F. are widely distributed in modern seas, and their skeletons may form ooze on the ocean floor, e.g. *Globigerina* ooze. They are very common as fossils in certain geological formations, and are of great economic importance as index fossils in correlating oil-bearing and associated strata. They are the most important group of fossils in micro-palaeontology (q.v.). See J. A. Cushman, *Foraminifera, Their Classification and Economic Use*, 1948.

Forbach, Fr. tn, cap. of an arron., in the dept of Moselle. It was the scene of a Fr. defeat during the Franco-Prussian War (q.v.), and was damaged in the Second World War. There are coal mines, and iron works, and glass and pottery are manufactured. Pop. 9600.

Forbes, Archibald (1838-1900), journalist, b. Keith, Morayshire. He served in the Royal Dragoons, but soon abandoned the army for journalism, and joined the staff of the *Daily News* as war correspondent, accompanying the Ger. Army through the war of 1870-1. During the Afghanistan campaign of 1878-9 F. was under fire, and after that he visited Mandalay and Zululand, and his famous ride of 120 m. in 15 hrs to convey the news of the victory of Ulundi to England ranks as one of the finest achievements in journalistic enterprise. His pubs. include

Souvenirs of Some Continents, 1885, and *Memories and Studies of War and Peace*, 1895.

Forbes, David (1826-76), geologist and brother of Edward F., b. Douglas, Isle of Man. In England he was a pioneer in microscopic petrology, and was elected F.R.S. in 1858. Among his scientific papers are *The Relations of the Silurian and Metamorphic Rocks of the South of Norway*, 1855, *Researches in British Mineralogy*, 1867-8, and *The Causes producing Foliation in Rocks*, 1855, etc.

Forbes, Duncan (1685-1747), statesman and jurist, b. near Inverness. In 1709 he was admitted advocate at the Scottish Bar. He took an active part in putting down the rebellion of 1715. In 1725 he became lord advocate, and in 1737 he was made lord president of the court of session. By his exertions in the Hanoverian interest the rebellion of 1745 was prevented from spreading more widely among the clans. See his autobiography, 1748.

Forbes, Edward (1815-54), naturalist, b. Isle of Man. In 1843 he became prof. of botany at King's College, London, and curator of the Geological Society; and 10 years later he was elected to the chair of natural hist. in the univ. of Edinburgh. A new era in that branch of zoology was begun by his classification of the Brit. star-fishes. Upwards of 200 of his works and papers were pub., notably *Star-fishes*, 1842, *Naked-eyed Medusae*, 1848, *British Mollusca*, 1848, etc.; and, with T. Spratt, *Travels in Lycia*, 1847. See G. Wilson and A. Geikie, *Memoir of Edward Forbes*, 1861.

Forbes, James David (1809-68), scientist, b. Edinburgh, grandson of Sir W. F. (1739-1806). Elected F.R.S. in 1832. He was prof. of natural philosophy at Edinburgh Univ., 1833-60, and then became principal of St Andrews United College. With Brewster he helped to found the Brit. Association, 1831. His discoveries relative to the movement of glaciers and the polarisation of heat and light are famous. The latter subject is described in 'Researches on Heat' (*Transactions of the Royal Society of Edinburgh*) in which he explains the polarisation of heat by different methods. Among his pub. are *Travels through the Alps of Savoy* . . ., 1843, *Norway and its Glaciers*, 1853, *Tour of Mont Blanc and Monte Rosa*, 1855, *Dissertation on the Progress of Mathematical and Physical Science*, 1858, *Occasional Papers on the Theory of Glaciers*, 1859, contributions to the *Edinburgh Philosophical Journal*, signed '4'. See J. Tyndall, *Professor Forbes and his Biographers*, 1873.

Forbes, Joan Rosita (1893-), travel writer, b. Swindley, Lincs, daughter of Herbert F. Torr. She married, first, Col. R. F., whom she divorced, and later Col. A. T. McGrath of the War Office. Frail-looking, beautiful, and very feminine, she was nevertheless a great traveller, visiting such out-of-the-way parts as Libya, Ethiopia, Syria, the Balkans, Central Asia, and South America. During the First World War she drove an

ambulance for the Fr. Red Cross. Her books include *From Red Sea to Blue Nile*, 1925, *Angora to Afghanistan*, 1931, *The Secret of the Sahara*, 1931, *Eight Republics in Search of a Future*, 1933, *Kabul to Samarkand*, 1937, *A Unicorn in the Bahamas*, 1939, *The Prodigious Caribbean*, 1940, and *Islands in the Sun*, 1949. *Appointment in the Sun*, 1946, is an autobiography.

Forbes, Stanhope Alexander (1857-1947), painter, b. Dublin; educ. at Dulwich College, the Lambeth School of Art, and the Royal Academy schools. He also studied in Paris, and became a pupil of Léon Bonnat, by whom and by Jules Bastien-Lepage his subsequent work was strongly influenced. Scenes of everyday life, realistic in atmosphere, were his subjects, and he became a leader of the Newlyn school of painters in Cornwall. He exhibited in the Royal Academy from 1882, when he was elected A.R.A., becoming R.A. in 1910. His first wife, Elizabeth, was also an artist of distinction, whose influence, like that of her husband, was exerted on the Cornish school of painters. Elizabeth F. d. in 1912. The fresco of the 'Fire of London,' which F. painted for the Royal Exchange, was completed in 1899. Among his best pictures are 'The Fish Sale on the Cornish Beach,' 'By Order of the Court,' 'Forging the Anchor,' 'The Smithy,' and 'The New Calf.' In later life he turned his attention away from genre painting, and more to landscape.

Forbes, tn in Ashburnham co., New South Wales, Australia, on the r. b. of the Lachlan R., 90 m. W. of Bathurst. It serves the surrounding agric. and pastoral dists. Pop. 6620.

Forbes-Robertson, Lady, see ELLIOTT, MAY GERTRUDE.

Forbes-Robertson, Sir Johnston (1853-1937), actor, b. London; son of the art critic (d. 1903); educ. at Charterhouse, Rouen, and Royal Academy schools. He early won reputation as a painter, exhibiting at the Royal Academy about 1870. He studied elocution under S. Phelps, making his first stage appearance in 1874, and soon became one of the foremost actors of his time, noted for his beautiful voice. He toured with Ellen Terry, and acted also with her sister Marion, making a hit in *Dr and Mrs Neill*, and as Geoffrey Wynyard in *Dan'l Druce*, 1876. He acted with the Bancrofts, Hare, and Henry Irving, and under his own management with Mrs Patrick Campbell won success in *The Notorious Mrs Elphinstone*, 1895, *Romeo and Juliet*, and other plays. He played with Mary Anderson in *The Winter's Tale*, 1887, designing the dresses for this production. Among his noted Shakespearian roles were Hamlet (he was probably the finest Hamlet the stage has ever seen), Othello, Shylock, Leontes, and Macbeth. As a romantic actor he triumphed in *For the Crown*, 1896, *Mice and Men*, 1902, *The Light that Failed*, 1903, and *The Passing of the Third Floor Back*, 1908. He married Gertrude Elliott in 1900, and appeared with her as his

leading lady—frequently touring in America, where *Caesar and Cleopatra* was first produced, 1906. His farewell London season was held at Drury Lane, 1913, with selections from his repertoire. He was knighted in 1913, and retired from the stage in 1915. He wrote *A Player under Three Reigns*, 1925.

Forbidden Fruit, or **Adam's Apple**, so called from the fruit forbidden to Adam (Gen. ii. 17), is the name often applied to sev. species of *Citrus*, especially on the Continent to *C. decumana*, a Malayan or Chinese tree much cultivated in India and Florida. *C. medica* (variety *paradisi*) is also so called. In Great Britain pomeloes, a variety of shaddock, are known by this name. The fruit of *Tabernemontana diehotoma* (Apocynaceae) in Ceylon also bears the name, and is fabled to be poisonous since Eve ate of it.

Forbin, Claude, Comte de (1656-1733), one of the greatest Fr. naval commanders. He showed reckless courage at Messina (1675), the Antilles (1680), Algeria (1682-1683). He accompanied Chaumont to Siam, 1685, becoming admiral to the king of Siam, 1686-9. As *chef d'escadre* in the Sp. Succession war, he fought often against the Eng. and Dutch, 1702-10. His *Mémoires* were ed. by Reboulet, 1730. See life by A. Richer, 1784.

Force, in mechanics, that which changes or tends to change a body's state of rest, or of uniform motion in a straight line. This definition is derived from Newton's first law of motion, which states that every body continues in its state of rest, or of uniform motion in a straight line, except in so far as it may be compelled by impressed F. to change that state. We can only get an idea of F. by observing its effects, that is, F. can only be measured by measuring the change of motion produced by it. Thus Newton's second law states that change of motion is proportional to the impressed F., and takes place in the direction in which the F. acts. By motion Newton meant momentum, which is a function of the mass of a body as well as of its velocity. This agrees with our experience, because the idea of force is derived from muscular effort, and we know that we have to exert more strength to stop the motion of a heavy body than of a light one, just as we have to exert more strength to stop the motion of a rapidly moving body than of a slowly moving one. F., then, is measured by change of momentum, momentum being equal to mass \times velocity. But it is obvious that the longer the F. acts the greater is its effect in changing the momentum. Therefore, we have F. proportional to change of momentum and inversely proportional to the time. The unit of F. may now be expressed as that F. which produces on a unit of mass a unit change of velocity in a unit of time, or, more concisely, $F. = \text{mass} \times \text{acceleration}$. Given the foot as unit of length, pound as unit of mass, and second as unit of time, we have as the derived unit of F. that F. which, acting on a mass of 1 lb. for 1 sec., produces an additional velocity of 1 ft per sec., or,

assuming that the body is originally at rest, that F. which acting on a mass of 1 lb. for a sec., produces in it a velocity of 1 ft per sec.; this unit is called the *poundal*. In the C.G.S. system of units, the unit of F. is the *dynes* (q.v.), which is that F. which produces in a mass of 1 gramme an acceleration of 1 centimetre per sec. per sec. See F. Barraclough and E. J. Holmyard, *Mechanics for Beginners*, 1931, 1947. See also METROLOGY.

Forced Vibrations, see RESONANCE.

Forcellini, Egidio (1688-1768), It. savant, pupil of Jacopo Facciolati (q.v.). It was F. who assisted the latter in his great work, and F. in his turn, on Facciolati's suggestion, compiled the great *Lexicon infans latinatis* (pub. posthumously in 1771), which had many eds.; the last one (ed. by Francesco Corradini and Giuseppe Perin), in 4 vols., was pub. in Padua in 1864-98; it is still useful for the study of Lat. lexicography.

Forceps, 2-bladed metal instrument of the nature of pliers or pincers, used for seizing and holding objects firmly, especially in surgical and obstetric operations, and by dentists and watchmakers. There are many varieties, such as the dissecting F. with rounded points, the lithotomy F., the artery F., Liston's cutting F., and the fenestrated F. with apertures in the blade. The midwifery F., invented by P. Chamberlen in the 17th cent., came into general use in the 18th cent. Chemists and mineralogists use small F. for adjusting weights and working with the blowpipe. In entomology, the word is applied to an organ or part of the body resembling a F., or to one of its 2 branches. Examples are the horny appendages at the extremity of the abdomen, found in many male insects, such as the earwig's caudal appendage.

Forces, Parallelogram of, see PARALLELOGRAM OF VECTORS.

Forchheim, Ger. tn in the *Land* of Bavaria (q.v.), on the Ludwigskanal (see REGNITZ), 104 m. N. by W. of Munich. In the early Middle Ages it was an important city of the empire, and was the scene of the coronations of Arnulf of Carinthia and Louis IV 'l'Enfant' (q.v.). Later it belonged to the bishops of Bamberg (q.v.). It has a palace, a fortress, and many other old buildings. Textiles and dyes are manufactured. Pop. 19,000.

Forcible Entry, see ENTRY.

Forcing, acceleration of maturity in flower, vegetable, or fruit, according to whether blooms, fruit, or foliage are desired. Warmth is essential for F., and while in some cases a hotbed provides sufficient temp., in other cases elaborately equipped F. houses are needed. Among flowering plants, hardy shrubs are most easily forced into early bloom, but they must be thoroughly matured and well provided with flower buds, or foliage instead of blooms will be produced. A large variety of bulbs and bulbous-rooted plants are well suited for F., and lilies of the valley are brought into bloom throughout the whole year. Most kinds of fruit

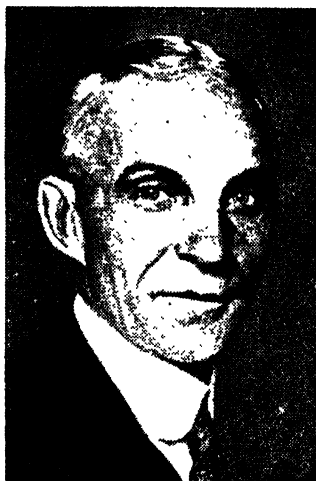
can be produced by F. Strawberries are grown in pots standing on ash beds, and in a temp of 75° fruit can be ripened by Christmas. Forced tomatoes need a similar temp., but they meet with a very severe competition from importations from warmer countries and scarcely pay to grow. Grapes can be ripened at almost any time from the early spring by starting the shoot in a temp. of about 40° and gradually increasing it until after the flowering period, when from 60° to 70° is needed. Peaches, nectarines, and figs are forced in pots, starting with a temp. of 45° and increasing to 60°. Hardier fruits are forced in cold or orchard houses. Asparagus, potatoes, lettuce, endive, and other salad plants, scakale, chicory, and rhubarb are all easily forced on hotbeds; the 3 last need to be kept in the dark, but the others need abundance of light. Remarkable experiments have recently shown that the natural resting period of plants can be intensified by exposing them with their roots in an air-tight box to chloroform or ether. This is followed by much increased activity, and lilac and azalea blooms have been produced in about a fortnight: lilacs of the valley were forced into flower in only 10 days. F. some of the hardier flowering plants is simplified by retarding the growth for a time in a refrigerating chamber. Following such treatment, lilacs, lilacs, spiraeas, and *Azalea mollis* will come quickly into flower in an ordinary cool greenhouse.

Ford, Edward Onslow (1852-1901), sculptor, studied painting in Antwerp and Munich, 1870-2, and then took up sculpture; he was elected R.A., 1895. His most famous works are statues of Sir Rowland Hill, 1882 (Royal Exchange); W. E. Gladstone, 1883, Irving as 'Hamlet,' 1883; Gen. Gordon, 1890 (Chatham); Shelley memorial at Univ. College, Oxford; Marlowe memorial at Canterbury; Huxley, 1900 (Brit. Museum of Natural Hist.); busts of Millais, Briton, Rivière, and others, statuettes of 'Folly,' 'Music,' 'Dancing' (Tate Gallery); a relief, 'In Memoriam,' 1885. See M. H. Spielmann, *British Sculpture and Sculptors of To-day*, 1901.

Ford, Ford Madox, formerly **Ford Hermann Hueffer** (1873-1939), novelist and poet, b. Merton, Surrey. His grandfather was Ford Madox Brown, the artist whose life he wrote in 1896. After publishing *Poems for Pictures*, 1897, he collaborated with Joseph Conrad (q.v.) in 2 novels, *The Inheritors*, 1901, and *Romance*, 1903, and wrote independently *The Fifth Queen*, 1906, and *The Half Moon*, 1909. In 1908 he founded the *English Review*. During the First World War he served in a Welsh regiment, and wrote *The Good Soldier*, 1915. After the war, having changed his name to Ford, he pub. a series of war novels, *Some Do Not*, 1924, *No More Parades*, 1925, *A Man Could Stand Up*, 1926, and *The Last Post*, 1928. His *Collected Poems* appeared in 1913 and *New Poems* in 1927. Among his critical works are books on Henry James, 1913, Conrad, 1924, and the Eng.

novel, 1929. In 1924 he ed. the *Transatlantic review* in Paris. Thus to Revisit, 1921, *It Was the Nightingale*, 1933, and *Memories and Criticisms*, 1938, are vols. of reminiscences. See D. Goldring, *The Last Pre-Raphaelite*, 1948.

Ford, Henry (1863-1947), Amer. industrialist and one of the greatest manufacturers of motor-cars in the world, b. Greenfield, near Dearborn, Michigan, U.S.A.; son of Wm Ford, farmer of Irish stock. His mother was of mixed Dutch and Scandinavian origin. He was educ. at the dist. school, where he seemed good, but not brilliant, at his studies. In 1880



Topical Press

HENRY FORD

he obtained a situation at \$2.50 a week in a machine-shop in Detroit, and night-work at mending watches—a thing he had taught himself at home. On his father's farm he experimented in the manuf. of a steam tractor. In 1884 his father presented him with 40 ac. of timbered land, on which he erected and worked a saw-mill to dispose of the wood. In 1887 he became machinist in the employ of the Edison company in Detroit, which thereafter was the centre of his activities. In 1896 he produced his first motor-car—a 2-cylinder 4 h.p. In 1899 he left the Edison company and went into the motor-car business—founding the Detroit Automobile Company. He disagreed with his fellow-directors, who wished to restrict output to orders; and he resigned directorship in 1902. By himself he built some 4-cylindred cars; and one, called 999, won all the races for which it was entered. Then he formed the Ford Motor Company with a nominal cap. of \$100,000: by 1926

its assets were valued at \$1,000,000,000. The stock was entirely held by F. and his son, who bought out the other stockholders. He introduced vanadium-steel into motor construction; and in 1909 the company standardised the 'T' model, which was the F. car known all over the world, and was superseded only in 1927 by the 'A' model.

In 1916 he turned his attention to his early preference, the farm tractor, and his Fordson tractor proved of notable use in Britain when there was a food shortage through the Ger. submarine campaign in the First World War. Within 28 years of his start F. had put 20,000,000 cars on the road. His factories employed 200,000 persons, and comprised some 50 complete businesses. In 1914 he made known that throughout his plants there was to be a standard wage of \$5 a day, which at the time was nearly double the average figure of Detroit. Subsequently, when he realised that the old car had had its day, he shut down all his plants, did not reopen until the new models were ready, and then started afresh in full power. In 1940 he built the vast bomber plant of Willow Run. Through 1941-2 Willow Run had the appearance of mass-production's most spectacular failure; but afterwards it functioned to scale when F. had surmounted the difficulties imposed by labour, transport, and the conditions of gov. contracts. He is said to have been a scornful opponent of unionism, and he always argued that no trade union could get for its members any benefit to compare with the F. standard wage. But in some things he moved with the times, and the H. F. hospital in Detroit is a free institution of unrivalled excellence, with the highest standard of comfort and equipment. A few m. out of Detroit, adjoining Greenfield, is the F. Museum of Amer. Hist., the main building of which reproduces, in Georgian brick, the noble Independence Hall of Philadelphia. That F. was a visionary, ignorant of much that quite ordinary people knew, but with goodwill for all, is illustrated by the fact that in 1915-16 he visited Europe as leader of a peace party, whose members went to various neutral caps. in an endeavour to end the war. Yet, in spite of his character as an emotional visionary, he had a power of handling the practical things of life which has seldom been surpassed. In 1918 he ran unsuccessfully for the Senate, and in 1923 there was some talk that he would run for the presidency, but later he announced his refusal to stand against Mr Coolidge. In the following year his acquisition of the Dagenham sites in addition to his Trafford Park and Cork works was announced. This was part of a post-war policy of expansion, and between 1931 and 1946 over 1,000,000 vehicles were manufactured at the Dagenham factory alone. He founded factories in many European countries, but his plant at Dagenham is the largest outside the U.S.A. He then went into the civil aviation business, and soon afterwards his all-metal monoplanes were on sale. The

industrial empire which F.'s imagination and energy estab. was in due course to yield him an immense fortune; but wealth was never his goal. F. wrote 4 books concerning his own life's work and ideals: *My Life and Work*, 1922, and *To-day and To-morrow*, 1926, both in collaboration with Samuel Crowther, *Philosophy of Labour*, 1929, and *Moving Forward*, 1930. See K. C. Thalheim, *Sozialkritik und Sozialreform bei Abbe, Rathenau und Ford*, 1929.

Ford, John (c. 1586-c. 1640), dramatist, b. Ilstington, Devonshire. His mother was a sister of Lord Chief Justice Popham. F. matriculated at Exeter College, Oxford, 1601, and in 1602 became a member of the Middle Temple. In 1606 he pub. his first work, *Fame's Memorial*, an elegy on the death of the earl of Devonshire, with a dedicatory sonnet to Penelope, the earl's widow. In the same year he issued *Honor Triumphant, or the Peeres Challenge*, a prose pamphlet, and also, appended to the latter, *The Monarches Meeting*, a poem. In 1613 his first comedy, *An Ill Beginning has a Good End*, was produced at the Cockpit, but is not extant. In 1621 he collaborated with Dekker and Rowley in *The Witch of Edmonton*. Other plays and masques produced in collaboration are *The Sun's Darling*, 1623, *The Fairy Knight* (masque), and *The Bristolwe Merchant*, 1624, with Dekker; and *A late Murder of the Son upon the Mother*, 1624, with Webster. In 1629 a comedy, *The Lover's Melancholy* (psychological, and indebted as to sev. passages to Burton's *Anatomy*), produced 1628, was the first of his plays to be printed. In 1633 his 2 best tragedies, *'Tis Pity She's a Whore* and *The Broken Heart*, appeared. These are little inferior in impressiveness to the best works of Webster. His other plays are *Lone's Sacrifice*, 1633, in which Bianca is one of the best drawn of all F.'s characters; *The Chronicle History of Perkin Warbeck*, 1634, one of the best historical dramas since Shakespeare; *The Fancies Chaste and Noble*, 1638, well constructed but marred by a ridiculous story; *The Lady's Trial*, 1638 or 1639; and sev. lost dramas. F. is one of the most modern of the Elizabethans: he studied the sources of action and, as a psychologist, subtly analysed the human soul. See A. C. Swinburne, *Essays and Studies*, 1875; and M. J. Sargeant, *John Ford*, 1935.

Ford, John (Sean O'Feeney) (1895-), Amer. film director, b. Portland, Maine. He won the Academy Award for the best direction in 1935, 1940, 1941, and 1952 (*The Quiet Man*). His films include *The Informer*, *The Plough and the Stars*, *Stage Coach*, *The Grapes of Wrath*, *The Long Voyage Home*, *Tobacco Road*, *How Green Was My Valley*, *My Darling Clementine*, *The Fugitive*, and *Mister Roberts*.

Ford, Richard (1796-1858), Brit. writer on art and travel. Educ. at Winchester and at Trinity College, Oxford, he was called to the Bar at Lincoln's Inn but never practised. From 1830 to 1833 he travelled in Spain, becoming intimately

acquainted with the country and people. The work by which he is remembered is his *Handbook for Travellers in Spain*, 1845. This is much more than a mere guide-book, and remains one of the earliest and best of travellers' handbooks, notable for its literary quality. He also wrote *Gatherings from Spain*, 1846. An accomplished artist and art critic, F. was the first to make Velasquez (q.v.) generally known in England.

Ford, Thomas (c. 1580-1648), lutenist and composer. It is not known where he was b., nor what he did before 1607, when he pub. *Musicke of Sundrie Kindes*, containing airs performable by voice and lute or by 4 voices, and dances for various instruments. In 1611 he was musician to Prince Henry, in 1626 to Charles I, and in 1614 he contributed to Leighton's *Tears and Lamentations*. He also wrote rounds and catches, and was a great melodist, as is shown by the still familiar air 'Since first I saw your face.'

Ford Foundation, founded by Henry F. and his family in 1936. Its policy is to support 5 areas of public welfare: public affairs, education, economic development and administration, behavioural science, and international peace and understanding. It does not provide funds for medicine or natural science. Its assets in 1964 were \$493,213,842.

Forde, Francis Michael (1890-), Australian statesman, b. Mitchell, Queensland, member of the legislative assembly, Queensland, since 1955. He first entered Queensland Parliament in 1917, was the member for Capricornia in the house of representatives, 1922-46, Australian high commissioner in Canada, 1946-53. F. was minister for trade and customs, 1930-1, and acting minister for markets and transport, 1930-1, in the Scullin gov. He was minister for the army, 1941-6, minister for defence, 1946, and deputy prime minister, 1941-5 and 1945-6. On sev. occasions, 1941-6, he was acting prime minister, and in July 1946 was prime minister for a short period. In 1945 he was a member of the Australian delegation to the U.N. Conference, San Francisco.

Fordingbridge, tn of Hants, England, on R. Avon, here crossed by a stone bridge, 10 m. S. of Salisbury. Pop. 4500.

Fordun, John of (d. c. 1384), Scottish chronicler. Little is known of his life. He is supposed to have been b. at F. in Kincardineshire, and to have been a secular priest and a chantry priest in the cathedral of Aberdeen. Between 1363 and 1384 he is said to have travelled on foot through Britain and Ireland in search of materials for his chronicle of Scotland. Of his *Scotichronicon*, or *Chronica Gentis Scotorum*, only 5 books are completed, and the work was continued in 1441 by Walter Bower (q.v.), who finally brought the hist. down to 1437. The work is the chief authority for Scottish hist. before the 15th cent.

Forecasts, Weather, see METEOROLOGY; WEATHER FORECAST.

Foreclosure, see MORTGAGE.

Foreign Debts, see PUBLIC DEBT.

Foreign Enlistment Act was an A. passed in 1870, which forbade the E. of any Brit. subject in the army or navy of any F. state at war with any friendly state. The A. states definitely that no Brit. subject shall under any conditions enter into the service of any state at war with a state which is friendly to Britain, save with the consent of the queen, or by an Order in Council. The officers of the customs or of any port have full power to detain any vessel concerning which they hold information that she is proceeding to the aid of some F. state which is at war with a friendly state. This legislation was an outcome of the celebrated *Alabama* case. Any ship so taken, together with all stores, arms, and equipment, is confiscated. It was under the provisions of this A. that the leaders of the 1895-6 Jameson Raid were punished.

Foreign Exchange, see EXCHANGES; METROLOGY.

Foreign Jurisdiction. The administration of Brit. law in countries outside the dominion of the Crown is regulated by the F. J. Act of 1890, extended by a further act in 1913. The power of exercising J. in F. countries may be acquired by the Crown as a result of treaty or capitulation, and is usually vested in the consular officers. The J. is generally limited to Brit. subjects or persons under Brit. protection, and covers civil and criminal cases. The F. J. Act may also apply in a Brit. protectorate, where the ter. not having been annexed, remains outside the normal colonial administration. See also CAPITULATIONS.

Foreign Law. The Eng. courts do not take judicial notice of F. L., and the party who relies on a F. L. must prove it like any other fact. Strictly, all F. L. has, as such, no extra-territorial force; such effect as it has is by virtue of comity (q.v.), and unless specially proved in any particular case, the L. of another state will be presumed to be similar to Eng. L. *Written* F. L.s must be proved by the text or some authoritative collection or duly certified copy of the same, expert evidence in such cases being merely by way of secondary evidence. F. unwritten L. is generally proved by oral evidence.

Foreign Legion, military unit formed of men who are foreigners to the country in whose service they are engaged. The best-known F. L. is the Fr. *régiment étranger*, organised in 1831, and later forming a permanent regiment of sev. battalions based on Algiers. Recruits were accepted for service of varying periods without proof of identity. A F. L. of Swiss and Germans volunteered for Brit. service in the Crimean war. F. L.s served in Spain in the First Carlist war, and in the Civil war, 1936-9.

Foreign Marriages, see MARRIAGE.

Foreign Monies, see METROLOGY.

Foreign Office (U.K.), that dept of the executive through which negotiations with foreign powers are conducted. At the head is the Prin. Secretary of State for Foreign Affairs, appointed from the

dominant party in Parliament. The Foreign Secretary (who has a Parl. Private Secretary) is assisted by 2 Ministers of State (each with a Parl. Private Secretary), 2 Parl. Under Secretaries, a Permanent Under Secretary, 4 Deputy Under Secretaries, and 7 Assistant Under Secretaries. It is needless to say that the post of Foreign Secretary is of such vital and commanding importance that it is essential to appoint to it a minister who, by reputation and attainments, is as far as possible above the rancour of merely party politics. In the discharge of his prin. function, which is nothing less than the formulation of Brit. foreign policy, the Foreign Secretary is responsible both to the Cabinet (q.v.) and to Parliament; and for the fulfilment of this function he is necessarily in constant touch with the ambas., envoys, plenipotentiaries, or other foreign representatives in England, and with Brit. diplomatic agents abroad, the latter of whom it is his duty to instruct (taking into consideration any advice that they may offer). Through Brit. ambas., etc., abroad and foreign representatives in England he should endeavour, so far as is consistent with Brit. state interests, to promote cordial relations with foreign powers. Among the purely formal duties of a Foreign Secretary are the reception of new ambas. and their presentation to the sovereign; among his other duties are the granting of passports, and the protection of all Brit. subjects abroad. In conjunction with the rest of the Cabinet the Foreign Secretary carries into execution the treaty-making prerogative of the Crown (q.v.). It should, however, be realised that the function of the F. O. is executive, i.e. it is not responsible for the actual formation of foreign policy but is responsible, under the direction of the Foreign Secretary, for carrying out the policy laid down by the Foreign Secretary and the Cabinet.

The creation of the combined Foreign Service was effected by the merger of the F. O. and Diplomatic Service, the Commercial Diplomatic Service, and the Consular Service. It was foreshadowed in 1941, and the proposal was carried into effect in 1943 by the passage of the Foreign Service Order in Council of that year. The system of recruiting for the service was also reformed. These reforms were the outcome of the report of Sir Malcolm Robertson to the Foreign Secretary on the reform of the Foreign Service, a report which, in part, recommended the acceptance of proposals urged upon the Brit. Gov. by the MacDonnell Commission in 1914. The abolition of the means test for the diplomatic service was one of the major reforms of 1919, and a number of far-reaching reforms both as to organisation and recruitment were made between the wars. The account of the reforms in the Foreign Service (explained in the House of Commons, 18 Mar. 1943) emphasised that diplomacy must now be based on the representation of the whole nation, and must comprehend the whole life of the nations to which it is accredited.

There is a growing fusion of politics and economics in foreign affairs which represents a great change from the old-established conception of diplomacy.

Foreign Relations Committee. The U.S.A. has a secretary of state in the president's cabinet who deals with F. affairs. The president is responsible for dealing with international subjects, but his decisions need the endorsement of two-thirds of the Senate. This arrangement, as laid down in the Constitution, was designed to maintain a democratic hold upon the F. policy of the gov. The difficulty of such a large body being required to deal with issues, many too delicate and intricate to permit open discussion, and the fact that the president has no absolute guarantee that his actions will be endorsed, have led to the establishment of the Senate, of a F. R. C., the restricted and qualified powers of which are fully realised by other nations. This C. works in close touch with the Senate and the president. Even when the F. R. C. approves an action by the president, it is not always certain that the Senate will approve.

Foreigner, see ALIEN.

Foreland, North and South, 2 capes of England, projecting from the E. coast of Kent. They are composed of chalk cliffs. N. F. is situated in lat. $51^{\circ} 22' 28''$ N., and long. $1^{\circ} 26' 48''$ E., and is 66 m. E. of London. A lighthouse is placed with a fixed light, 183 ft high, visible 20 m. off. S. F. is 16 m. S. of N. F., situated in lat. $51^{\circ} 8' 23''$ N., and long. $1^{\circ} 22' 22''$ E. It juts out into the Dover Strait, 4 m. N.E. from Dover. There are here 2 fixed lights which are visible at distances of 22 m. and 25 m. Near here was fought a naval battle in 1666, between the English under Albemarle and the Dutch under De Ruyter.

Forensic Ballistics, the art or science of bullet and firearms identification. Makers vary in the number, width, and direction of twist of the grooves they give their particular make of weapon, and in 1911 Robert Churchill was able in a famous murder trial to determine the make of weapon used. In 1924 Goddard and Waite in America discovered the comparison microscope which allows 2 objects to be microscopically compared through 1 single eyepiece. First used by Churchill in England in 1927, it allows comparison of the finer lines or striations within each bullet groove, and as each groove differs even from its next door neighbour a wealth of evidence allows the gun expert to relate a bullet definitely to the weapon which fired it. Further advances include identification of the striker indentation and breech markings on a fired cartridge case, all or any of which allow the gun expert to show that the fired bullet or fired cartridge case was fired from a particular weapon and could not have been fired from any other.

Forensic Medicine, see MEDICAL JURISPRUDENCE.

Foreshore, see SEASHORE and COAST PROTECTION.

Forest, Lee de, see DE FOREST.

Forest (Flem. *Vorst*), suburb of Brussels, Belgium, 3 m. to the SW. of the city. Pop. (1955) 49,000, engaged in agriculture and manufs. of stoves, footwear, carpets, chemicals, and soap. It has breweries and malt-houses.

Forest and Forest Laws. F. is defined by Manwood, the old authority on the F. L., as being 'a circuit of woodes, grounds, and pastures, known in its bounds, and privileged for the abiding of wild beasts and fowls of forest, chase, and warren, to be under the king's protection for his princely delight.' According to Coke, the royal F.s in his time appear to have been 69 in number, while the origin of by far the greater part was lost in remote antiquity. The 4 prin. F.s in England were the New F., Sherwood, Dean, and Windsor. Among the others were Epping (Essex), Dartmoor (Devon), Wichwood (Oxon), Salcey, Witlebury, and Rockingham (Northants), Waltham (Linces), and Richmond (Yorks). Prof. Freeman has pointed out that afforestation in its older connotation had nothing to do with trees, and simply meant putting a tract of land outside the common law in order to secure for the king, by special laws, the freer enjoyment of the pleasure of hunting. The F.s were the private property of the king, and trespassers were so barbarously punished that one of the chief things insisted upon in the early national demand for the reform of the F. L. was the mitigation of the severe code of punishments. The policy of afforestation of William I was continued by his immediate successors to the throne, but although the F.s were strictly guarded by the Conqueror, no F. L. are attributed to him. Subsequently, in the reign of Henry I, a system of F. L., with special courts for their administration, was estab., and developed by Henry II. These courts were (1) the Court of Attachments, or Woodmote, held every 40 days to punish offences against vert and venison (trees and covert and game); (2) the Court of Sweinmote, held 3 times a year, originally for business relating to agistment, but later to punish general offences under the F. L.; (3) the Court of Regard, held triennially, for the expeditation of dogs, i.e. the cutting of the claws in such a way as to prevent their use in hunting; and (4) the Court of Justice Seat, held before the itinerant justices of the F.s for the trial of all causes connected with F.s. Besides the justices, the officers were the wardens, verderers, foresters, agisters, regarders, keepers, bailiffs, and beadles. The assize of Woodstock of 1184 made attendance at the F. courts compulsory, and heavy fines were extorted for every breach of the F. L. The first substantial concessions were those granted by Magna Carta, under which all F.s made by John were to be disafforested, and all bad customs connected with F.s abolished. Then came the Carta de Foresta of Henry III, the first separate charter of F.s, which disafforested private lands improperly afforested, and abolished the

punishments of death and mutilation for offences against the F. L. This charter was confirmed by Henry III in 1225, but so often infringed by him and Edward I that the latter monarch had to promise and carry out reforms under the Articuli super Cartas of 1300. From the time of the Confirmatio Cartarum of 1327 the F. L. began to fall into disuse, and the oppressive powers vested in the Crown had almost ceased to be exercised at the time of the Stuart dynasty, when Charles I revived them with the object of replenishing his empty exchequer by fines for trespass. This was one of the grievances to which the Long Parliament directed its attention, and from the passing of the 16 Car. I. c. 16 the whole F. organisation fell into a state of decay. In 1817 the offices of warden, chief justice, and justice in eyre of the F.s were abolished, and the powers attached to these offices, relating mainly to the revenues of such royal F.s as remained, were vested in 1829 in the Commissioner of Woods, Forests, and Land Revenues. In 1832 the powers of the commissioner passed to the predecessors of the Commissioners of Woods and Forests, an emanation of the Commissioners of Works and Public Buildings. See FORESTRY.

Forest-fly, Hippobosca equina, a dipterous insect of the family Hippoboscidae which is found clinging to horses and cattle. After attachment to the host the wings of these blood-sucking insects are lost.

Forest Gate, populous suburb of E. London in the co. bor. of West Ham, 5 m. from the city of London. Pop. 33,000.

Forest of Dean, see DEAN, FOREST OF.

Forester, Cecil Scott (1899-), Brit. novelist, b. Cairo. Educ. at Dulwich College, he studied medicine at Guy's. His first book, a crime novel entitled *Payment Deferred*, 1926, was very successful and was dramatised. Later novels are *The Gun*, 1933, and *The Ship*, 1943, but he is best known by his 'Hornblower' series of naval stories, which include *The Happy Return*, 1937, *Flying Colours*, 1938, *A Ship of the Line*, 1939, which was awarded the Tait Black Memorial Prize, *The Commodore*, 1944, *Lord Hornblower*, 1946, *Mr Midshipman Hornblower*, 1950, and *Hornblower and the Atropos*, 1953.

Foresters, Ancient Order of, estab. 1834, having earlier formed part of the Royal Order of Foresters. It is one of the largest affiliated orders of friendly societies, that is a society having a central body to the funds of which branch bodies or 'Courts' contribute. The objects of the society are to secure to members, their wives, husbands, and other relatives or dependants weekly allowances during sickness or other infirmity, or in old age or widowhood, also to provide sums at death, during unemployment or other distress, and by way of endowment assurances. The branch courts are semi-autonomous bodies managed by the members, who are also engaged in social activities.

Forestry: Historical.—Forest may be described as an area set apart for the production of timber and other forest produce, or which is expected to exercise certain climatic effects or to protect a locality against injurious influences. Probably the greater part of the dry land was formerly covered with forests which consisted of a variety of trees, and which were grouped according to climate, soil, and configuration of the sev. localities. When old trees reached the limit of existence they disappeared and younger trees took their place, and conditions for uninterrupted continuation of the forest were thus rendered favourable. The result of this was a healthy and vigorous production by the creative powers of soil and climate. The interference of man broke this continuous chain and gradually the area under forest has been greatly reduced. Then the estab. of domestic animals showed the first decisive interference in the life of the forests. Forests were burnt down in order to obtain pasture and later for agric. purposes. In modern times the ruthless cutting down of trees for timber is a menace to the already decaying supply of wood and other forest products.

Character and Distribution of Forests

There are 5 prin. types of forest which can be distinguished, and their total area covers about one-fifth of the earth's land surface, or some 11,700,000 sq. m. *Firstly*, at the top of the map, there is the evergreen coniferous forest, which stretches round the world in a belt, 'the Conifer Belt,' across N. Russia and Siberia, Scandinavia, the Baltic countries, and Scotland, and then, on the other side of the Atlantic, from E. Canada to the Rockies and down the Pacific coast from Alaska to California. The upper edge of this belt marks the N. limit of tree growth, 'the timber line,' where, in the extreme N., trees become no more than prostrate shrubs and give way to mosses and lichens and finally to the eternal snows. It is from this conifer belt that the great bulk of the world's softwood timber is obtained. *Secondly*, the S. edge of the coniferous forest merges gradually and over a wide area into the mixed hardwood and softwood, but predominantly deciduous hardwood, forests of the N. Temperate Zone. This is a type of forest of which the woodlands of Britain, France, Germany, and Central Europe are typical, as are those of the NE. U.S.A. and the N. is. of Japan. *Thirdly*, in the sub-tropical or 'Mediterranean' climatic zone, a predominantly evergreen vegetation is found, the box and the olive for instance, the It. cypress, certain species of pine and fir, and the evergreen oaks, the cork oak among them. The deciduous sweet chestnut forests of Sardinia and Corsica, the walnut and the plane are also of importance, while across the Atlantic are found persimmon, dogwood, and the S. yellow or pitch pines of Florida. In the tropics are found the *fourth* and *fifth* types of forest. In areas

of high rainfall such as Central America, N. Brazil, W. Africa, and SE. Asia, the forests are dense and composed of many thousand different species of trees, the timbers of only comparatively few of which are of major commercial importance. In areas of low rainfall such as parts of India and E. Africa, a type of forest is found known as 'Savannah' forest, in which the trees are sparsely scattered in open rolling country usually covered in coarse grasses and low shrubs.

The 5 prin. types of forest can, therefore, be listed, from N. to S., as (i) evergreen coniferous forest; (ii) temperate hardwood forest; (iii) sub-tropical evergreen forest; (iv) tropical rain forest; and (v) tropical Savannah forest.

The Conifer Belt

In the E. hemisphere 2 species predominate, the Scots pine and the European or Norway spruce. They constitute between them the greater part of the forest area and are of first-rate economic importance for their timber. The imported wood of the Scots pine is known commercially in Great Britain as European redwood, redwood, red or yellow deal, Archangel, Baltic, Memel, Swedish, Finnish fir, etc. It is the most important structural wood in Europe, and huge quantities are imported from Finland, Russia, Sweden, and the Baltic States for all kinds of building work, flooring, joinery, railway sleepers, telegraph poles, boxes, pitwood, and many other purposes. The tree is native in Scotland. The European spruce is familiar as the Christmas tree and its timber is marketed as European whitewood, whitewood, white deal, white fir, etc. It is used for much the same purposes as European redwood and is important in addition as the prin. raw material in Europe for the manuf. of paper pulp. The tree is thought to have been introduced into Britain about 300 years ago. Found in company with these 2 trees are the European and Siberian larches, aspen, the timber of which is largely used for making matches, and the European birch. The latter, one of the few hardwood trees in addition to aspen which can thrive in the austere conditions natural to the conifers, is of considerable importance for the manuf. of plywood and has greatly increased in value in recent years.

Extensive coniferous forests are also found in Yugoslavia and the mountainous regions of SE. Europe. Across the Atlantic in E. Canada, the forests are very similar in appearance. Pine and spruce and birch again predominate, though of different species from those in the E. hemisphere. In the Rockies and on the Pacific coast, from Alaska to California, are found some of the finest forests in the world. The trees are longer-lived and attain much greater dimensions than those in any other part of the conifer belt. Douglas firs and Western red cedar trees of virgin growth are many of them centuries old and from 200 to 300 ft tall. Other important species are sitka.

aeroplane or silver spruce, Western hemlock, the true fir, Port Orford cedar, Nootka cypress from Alaska, and from the Rocky Mts ponderosa pine, Western white pine and Engelmann spruce.

The Temperate Hardwood Forests

The woodlands of Great Britain are typical of the temperate hardwood forests, the appearance of which will, therefore, be familiar. There is a much greater variety of species in the woods than there is in coniferous forests; though trees such as beech do sometimes form more or less pure woods in areas such as the Chilterns, for instance, where the soil is particularly suitable to beech. The prin. Brit. forest trees and those of Europe and N.E. U.S.A. are well known. Oak, ash, elm, beech, sweet chestnut, and sycamore are among the most important on this side of the Atlantic, but numerous others such as alder, willow, lime, wild cherry, and poplar are of use for particular purposes. In the E. U.S.A. and S. Ontario other species of these trees are found, with, in addition, maples, hickories, red gum, and the tulip tree which produces the timber known in this country as canary whitewood and in the U.S.A. as yellow poplar.

The Sub-Tropical Evergreen Forests

The sub-tropical zone in the N. hemisphere is not a zone of primary importance for the production of anything more than local supplies of timber. An exception is provided by those parts of the Southern yellow or pitch pine forests which extend into Florida and the is. of the Caribbean from the temperate climate of Virginia and the Carolinas. These forests are now much depleted as a result of over-cutting in the last 160 years, but they are still important as the source of supply of a very fine softwood timber. The cork oak forests of Portugal are also of interest in that they supply a large percentage of the world's cork, which is simply the outer bark of the trees and is peeled off from time to time on a regular rotation.

The Tropical Forest

The most extensive and most varied forests of all are those of the tropics. Large areas of forest have never been explored and doubtless contain many species of trees of which we have no knowledge. Broadly speaking, the timber of tropical trees is of 3 main types: (i) soft and light in weight, e.g. obeche from W. Africa, about 24 lb. per cub. ft; (ii) medium hard and heavy, e.g. teak from Burma and Siam, about 43 lb. per cub. ft; and (iii) very hard and heavy, e.g. greenheart from Brit. Guiana, about 65 lb. per cub. ft. There are enormous numbers of timbers of each type, many of them in common use in Great Britain. Some are 'specialist' timbers, that is timbers required for special purposes and which have special qualities that fit them for a particular use, examples being *lignum vitae*, the ebonyes, balsa, rose-

wood, and rare cabinet woods such as satinwood. There are also what may be called 'general utility' timbers such as gurgun and the red and white launas from Malaya and the Philippines, iroko and opepe from W. Africa, and peroba from Brazil.

The Southern Hemisphere

In comparison with the N. hemisphere, the conifers are poorly represented S. of the Equator, and, with the exception of insignis pine, an introduction from California, only 3 softwood genera produce timber in appreciable quantities. These are *Agathis*, *Araucaria*, and *Podocarpus*. The genus *Agathis* is represented by the kauri pine of New Zealand, a magnificent tree now rare, while the more important araucarias are Parana pine, of which there are extensive forests in the highlands of S. Brazil and N. Argentina, and the timber of which is well known in Great Britain; Chilo pine, which is the familiar monkey puzzle tree, often grown for ornament; the bunya pine of Queensland; and the hoop pine, which extends from E. Australia to New Guinea. *Podocarpus* is a large genus, containing over 60 species, and is found in Australia and New Zealand, tropical and South Africa, Central and South America, and in India and S.E. Asia as far N. as Japan.

As far as the hardwoods are concerned, one genus is of particular interest and importance, namely *Eucalyptus*. This is the 'type' genus of Australian forests and comprises about 500 species, which range in size from the giant 'gum trees,' the tallest hardwood trees in the world, to the scrub of the Australian Bush. The species best known in Britain are jarrah and karri from Western Australia, tallow-wood, Sydney blue gum, and Tasmanian and Victorian 'oak.'

Use of Forests

Forests are absolutely indispensable to mankind for both their direct and indirect value. They are indirectly valuable through their influence on climate, stability of soil, on moisture, and on the healthiness and beauty of the country. Their direct value is through the produce they yield. Bare land is exposed to the full effects of the sun and air-currents, and the climatic conditions produced by these agencies. Land which is covered with a growth of plants, and especially with dense forest, enjoys the benefits of certain agencies which modify the effect of sun and wind upon soil. The chief of these modifying agencies are (1) crowns of trees which intercept the rays of sun and falling rain and reduce radiation at night; (2) leaves, flowers, and fruits, together with certain plants which grow in shade of trees, form a layer of mould: this protects the soil against rapid change of temp. and greatly influences the movement of water in it; (3) roots of trees bind the soil together. By careful experiment the following results, proving the utility of forests, have been obtained:

(1) Forests reduce the temp. of air and soil to a moderate extent and render climate more equable; (2) they increase the humidity of the air and reduce evaporation; (3) they tend to increase the precipitation of moisture; (4) they help to regulate the water supply, tend to reduce violent floods, and produce a more sustained feeding of springs; (5) they assist in preventing denudation, erosion, landslips, and avalanches; (6) under certain conditions they improve the healthiness of a country and help its defence; (7) they increase the beauty of a country and tend

were transplanted from England by Philip II, husband of Queen Mary of England, the elm not being a native of Spain. In addition to the above-mentioned trees, the ash, the maple, the sycamore, and small-leaved limes may be enumerated as growing wild in Great Britain. The chief forests of England are the New Forest, the Forest of Dean, and Epping Forest.

The New Forest was originally a royal forest. The origin of royal forests is lost in antiquity. There are said at one time, in England alone, to have been 68 forests



OLD FOREST OAKS IN ENGLAND

to produce a healthy aesthetic influence upon people.

British Forests

The oak and the beech are natives of Great Britain. The elm was introduced at an early date. Each of these trees has its appropriate soil. In the W. part of the co. of Sussex we have 2 distinct belts of country, each strongly marked by the character of its vegetation. To the N. there is a strong and deep clay, admirably adapted to the growth of oak. Then come the chalk hills where the luxuriant growth of the beech attests that this tree has found its congenial soil. The elm is not met with N. of Stamford in Lincs. The elm seen in Scotland and the N. of England is the wych elm, a different species, growing in a more straggling form, with pendent branches and a larger leaf. Its wood is very unlike that of the Eng. elm, and more resembles that of the ash. In the approaches to some of the royal palaces in Spain are some rows of elms which, we are assured by Evelyn,

in the possession of the Crown. All the 68 forests have long ago been disafforested, in the sense that the sovereign has no longer the privilege of maintaining deer and other game in them for sport, protected by special laws and tribunals. A few forests only exist in the popular sense of the term, that the land is uncultivated and covered wholly or partially by woods, such as the New Forest, the Forest of Dean, Epping Forest, Windsor Forest, and the Forest of Dartmoor. The New Forest (Hants) was created by William the Conqueror, who in doing so is popularly believed to have devastated a wide dist. of cultivated land, demolished churches, and converted the land to the use of wild animals. The forest now consists of about 65,000 ac., of which a little over 2000 ac. are the demesne lands of the Crown, inclosed and cultivated, and the residue belongs to the Crown, but subject to the rights of common of a large body of owners and occupiers of cultivated lands in the neighbourhood of the forest. *The Forest of Dean*, about 19,000 ac. in

extent, is another of the few remaining royal forests, which has come under the consideration of Parliament in recent years, and where the policy of maintenance has prevailed over that of inclosure. The forest lies in the hundred of St Briavel, between the estuary of the Severn and the R. Wye, about 12 m. from Gloucester. The Crown is the owner of the soil and of all the timber growing on it. Of the forest, about 4000 ac. consist of heath and open land; the residue is planted with oak trees. *Epping Forest*

of state for Scotland being responsible for forest policy. The F. Act, 1951, placed responsibility on the commissioners for maintaining a reserve of growing trees and gave them powers to regulate felling through a system of licensing.

In their White Paper of 1943 (Command 6447) the commissioners proposed the formation of 5 million ac. of productive woodland, to be achieved in the main by the afforestation by the F. C. of 3 million ac. of low or no agric. value, and the restocking by private woodland owners



MATURE SCOTS PINE

consists of a little over 6900 ac. of woodland, open to the public at all points, extending for a distance of nearly 13 m. from Vanstead, on the confines of London, to beyond the vil. of Epping, with an irregular breadth at its widest part of about 1 m., and in its narrower parts of about half a m. It is densely covered with timber consisting of hornbeam, beech, and oak trees. See AFFORESTATION; DARTMOOR; DEAN, FOREST OF; EPPING; FOREST AND FOREST LAWS; FORESTRY COMMISSION; NEW FOREST; TIMBER; TREE; and articles under names of individual trees.

Forestry Commission, estab. by the F. Act of 1919, consists of a chairman and not more than 9 commissioners, appointed by the Crown. It has a general duty of promoting the interests of F., the development of afforestation, and the production and supply of timber in Britain. The F. Act, 1945, made provision for the reconstitution of the C., the minister of agriculture, fisheries and food and the secretary

and the C. of 2 million ac. of existing woodland considered suitable for economic management. Although the actual programme for the first decade has not been achieved, substantial progress has been made by both the F. C. and private woodland owners. In 1956, at Eggesford Forest, Devon, H.M. the Queen planted a tree and unveiled a commemorative stone to mark the planting by the F. C. of a million ac. of woodland. See also AFFORESTATION; FORESTRY; TIMBER.

Forez, anct Fr. co. in Lyonnais (q.v.), united to the crown in 1532. Its cap. was Montbrison (q.v.).

Forez, *Monts du*, mts in France, part of the Auvergnais, lying between the rvs. Allier and Loire. The highest peak is *Pierre sur Haute* (5380 ft.).

Forfar, royal burgh and co. tn of Angus, Scotland, in the fertile valley of Strathmore, 14 m. NE. of Dundee. F. was a royal residence of Malcolm Canmore and his Queen Margaret; its castle was destroyed by King Robert Bruce during

the Balleis Bruce dispute for the Scottish crown; later the ta was captured by Cromwell and its anct charter destroyed. Charles II granted a new charter in 1665 to reward F.'s loyalty. Its chief industry is jute manuf., but other fibres such as linen, wool, cotton, and modern synthetics are also woven. It has 2 large auction marts, and manufacturing and maintenance depots for farm implements and machinery. F. is in the S. Angus parl. constituency. Pop. 10,000.

Forfarshire, see ANGUS.

Forfeiture: (1) denotes the divesting of property or the loss of rights entailed by law as a consequence of some crime or breach of condition. Formerly any conviction and attainder (q.v.) for treason or felony was followed by the transfer to the Crown or the feudal superior of the person convicted of all his lands and goods. Since the passing of the Forfeiture Act, 1870, F., in this sense of the word, may be said to be practically obsolete. By that Act it is provided that no conviction for any treason, felony, or *felo de se* shall cause any attainder, F., or escheat. But the Act does not affect the consequences of outlawry or the putting of a person outside the protection of the law for refusing to make himself amenable to legal process. Apparently F. may still follow on conviction for misprision of treason (q.v.). But the Forfeiture Act further provides that the property of a convicted felon may be committed to the custody and management of an administrator appointed by the court, or in default of such administrator to the management of an interim curator appointed by magistrates on an application made on behalf of the convict or his family. The management of the convict's estate, whether by an administrator or curator, is, of course, entirely in the interests of his family; but the Act allows the court to order a convicted felon to pay a sum not exceeding £100 as compensation for loss sustained by any person in consequence of the felony. But a conviction for treason or felony, where the sentence is at least imprisonment for more than 12 months, or, if less, with hard labour superadded, entails the loss of any military, naval, or civil office, or any other public employment or eccles. benefice or pension or superannuation allowance, unless a pardon is received within 2 months after conviction, or before the filling up of the office if the pardon comes at a later period. Furthermore, sentence completed, the felon until pardoned is debarred for the future from the above offices, and from sitting in Parliament or exercising the parl. or municipal franchise. (2) F. also denotes the loss of land or hereditaments consequent on a breach of covenant between landlord and tenant. But the right to take advantage of a F. may be waived by any act of the landlord which recognises the continuance of the title of the tenant, as, for example, the acceptance of rent by him in respect of a time subsequent to the act by which the F. was incurred. Equity, however, has for long

given a tenant a right to apply for relief upon certain terms, such as payment of compensation to the landlord. (3) F. in the language of statutes is used to denote 'penalty.' (4) The term is now used to denote the seizure by revenue officers, the police, or other authorised persons of goods in regard to which some breach of the law has been committed. (5) Failure to perform the condition of a bond on the part of the obligor (see BOND) formerly entailed a penalty. Equity, however, has long relieved the obligor from F. of anything more than the other party was in conscience entitled to be paid. The like observations apply to the case of foreclosure as between mortgagor and mortgagee. (6) As to F. of contraband of war see DECLARATION OF LONDON. Other uses of the term, such as F. of marriage—the penalty imposed on a ward who married contrary to the wishes of a guardian—and F. for waste of a freehold inheritance, are obsolete. See also CONFISCATION.

Forged Transfer Acts, 1891 and 1892.

The F. T. A. empower a company to make cash compensation out of its funds for any loss occasioned by a F. T. of its shares or stock, or by a transfer under power of attorney. It is always desirable to set aside a fund exclusively for such compensation, because the title of the true owner of shares can never be affected by a F. T., and he can always compel the company to recognise him as the holder of the shares so transferred, and to cancel the F. T. The F. T. A. enable a company to form a compensation fund by insurance or out of reserve cap., or in any other way it may resolve upon; and it may also borrow on mortgage to effect the same object. If the company elects to create the fund by insurance it may do so by charging fees not exceeding 1s. per £100, and not less than 3d. The F. T. A. also empower a company to guard itself against loss from F. T.s by imposing reasonable restrictions on the right to transfer shares, as, for example, by giving the directors the right of veto. See Buckley on Companies and Limited Partnerships Acts; and Palmer's Company Law.

Forgery, falsification or alteration of any document or writing with intent to defraud. The crime is only a misdemeanour at common law; but as commerce developed and paper credit became proportionately extended, many acts were passed making F.s of the more important types of official and commercial documents felonies, punishable in most cases by terms of imprisonment ranging from 7 years to life. A F. which is a misdemeanour is punishable by 2 years' imprisonment, fine, or binding over. It is also an offence to alter or 'put off' a document knowing it to be forged. There can be no conviction for statutory F. unless the instrument purports on the face of it to be valid for the purposes for which it was created; hence a forged cheque with no signature to it will sustain at most only a charge of F. at common law. F. only applies to documents in

off a counterfeit picture for that of a particular artist by painting his name in the corner is not F., though it may constitute obtaining by false pretences. F. implies a general intent to defraud and not necessarily an intent to defraud any particular person. It may be noted that an instrument may be a F. even though the forger has put his own name to it, e.g. if A transfers shares to B, and subsequently with a fraudulent intent purports to assign the same shares to C by a signed transfer, the latter instrument is a F. See also COINING.

Forgery in Art, or Faking, is the executing of a new or altering of an existing work of art with the intention of passing it off as the work of a particular famous artist or of a well-known 'school' or period—usually that of the old masters. The art of faking—a source of considerable amusement and excitement to the world at large—is a serious matter for dealers, collectors, etc., and the ever-increasing resources of science are needed and used to the full in this battle of wits in which the unravelling of a good piece of faking is rather like the unfolding of a first-class detective story.

Faking can take many forms—complete copies, touching up and additions, imitations, transpositions, etc., 'variations in the style of.' Methods of detection include examination of technique and materials and details of costume, inscriptions, furnishings, etc. The general run of faking is crude enough and usually designed to be accepted as the work of a minor artist of the period currently most popular with collectors: real artistic talent is more likely to interfere with slavish imitation and strike a discordant note. There are, however, fakes which have genuine merit, e.g. the Renaissance sculptures of Giovanni Bastiani, which have a place of their own in the Victoria and Albert Museum, and Rouchomovsky's famous gold bottle. The Van Meegeren (q.v.) case in 1948 concerning forged Vermeers and de Hoochs was typical of the interest aroused in art F.: here the forger seemed to have a genuine talent perverted by admiration of his own cleverness. There are at present only 2 collections of avowed fakes—Dr Ruhemann's and that of the scientific dept of the Courtauld Institute of Art—and these are invaluable for teaching purposes. See O. Kurz, *Fakes: a Handbook for Collectors and Students*, 1948; and H. Tietze, *Genuine and False*, 1948.

Forget-me-not, popular name of herbs of the genus *Myosotis*, family Boraginaceae, sometimes called scorpion grass. Common F. is *M. arvensis*; early F., *M. hispidula*; yellow and blue F., *M. discolor*; all anns.; while the water F.s, *M. palustris*, *M. secunda*, are perennial, and the wood F., *M. sylvatica*, is also perennial. All the foregoing are found in Britain and Europe. *M. alpestris* is alpine, native to mts of N. Britain. Mostly blue-flowering though colour changes with ageing.

'Forget Me Not' (anthology), see ANNUALS.

Forging, see ANNEALING; DROP-FORGING; METALLURGY; WELDING.

Forio, It. tn, on the W. coast of the is. of Ischia (q.v.). It has hot springs. Pop. 6400.

Fork (Lat. *furca*), implement used for different purposes, and having 2 or more points or prongs. The various kinds of F. include F.s for the table, pitch-F.s, hay-F.s, and tuning-F.s (q.v.). The table-F. does not seem to have been used in England before the reign of Charles I. The oldest Eng. F. known is at present in the Victoria and Albert Museum, London. It was made for John, earl of Rutland, in 1632, and has 2 prongs. F.s are made of various materials, such as silver, silver plate, white metal, and steel. The making of F.s consists first in forging the tang,



FORGET-ME-NOT

shoulder, and shank, and the piece from which the prongs are made. The other processes are the grinding, polishing, and basting or fitting into the handle. The hay-F., used for turning and tossing hay, and the pitch-F. have long wooden handles—occasionally short ones—and usually 2 prongs called tines. There is also a 3-pronged F. used for some purposes in agriculture and the 4-pronged garden fork. See also TUNING-FORK.

Forlì: 1. Prov. of Italy, in SE. Emilia-Romagna (q.v.). It is mainly in the Apennines (q.v.), but has a broad plain in the E. and NE., and a coastline in the E. on the Adriatic. There are numerous riv. valleys, running generally NE.-SW.; the chief rivs. are the Montone, Ronco, Savio, and Marecchia. The prin. tns include F., Rimini, and Cesena (qq.v.). Area 1145 sq. m.; pop. 495,000.

2. (anc. Forum Livii) It. city, cap. of the prov. of F., on the Montone, 38 m. SE. of Bologna (q.v.). It stands on the Aemilian Way (q.v.), against a background of low hills. There is a cathedral (17th cent.), and a fine Romanesque abbey church (begun 1179) with a noteworthy campanile. The 14th-cent. castle was taken by Cesare Borgia (q.v.) from

Catherina Sforza in 1499. F. is an important agric. centre, and has rayon, woollen, and silk industries. Pop. 81,000.

Form: 1. In philosophy, F. means that which makes matter a determinate species (see **FORMALISM**).

2. In music, the F. of a composition is the course it is planned to take from beginning to end in such a way as to unfold itself logically, as for example by means of an exposition, working-out section, recapitulation and (optional) coda in first-movement sonata F., or the periodical statement of a subject intersected by episodes in a rondo. Fugues, minuets, or scherzi with their trios, various old dances, etc., also have their recognised F.s, while fantasies, rhapsodies, etc., may be treated quite freely from the formal point of view, though they must not be allowed to fall into mere shapelessness. See **FUGUE**; **RONDO**; **SCHERZO**; **SONATA**; **SUITE**; **SYMPHONY**; **VARIATIONS**.

Forma Pauperis, see **IN FORMA**.

Formaldehyde ($\text{H}\cdot\text{CHO}$), one of the organic substances called aldehydes which are formed when the primary alcohols lose 2 atoms of hydrogen, hence alcohol *dehydrogenatum*. F. is prepared by oxidising methyl alcohol by passing air saturated with the alcohol vapour over red-hot platinised asbestos. It is a gas at ordinary temps., condensing at -21°C . It rapidly decomposes to form metaformaldehyde, a crystalline compound. When the metaformaldehyde is heated F. is again formed, which decomposes once more on cooling. When the aqueous solution of F. is evaporated, the F. is converted into paraformaldehyde, an amorphous substance. All 3 substances have the same percentage composition, so that they form an example of polymerisation. F. occurs in the chlorophyll cells of plants, and is an effective germicide. **Formalin** is a trade product, consisting of an aqueous solution containing about 40 per cent of F.: it is much used as an antiseptic. F. reacts with ammonia to form a white solid, hexamine, which, when treated with concentrated nitric acid, yields cyclonite ($\text{CH}_3\cdot\text{N}\cdot\text{NO}_2$). Cyclonite (R.D.X.) was a prin. ingredient in the under-water explosive used against U-boats in the Second World War. With phenol (q.v.) F. reacts to form the well-known and extensively used plastic bakelite. F. is used in tanning leather, in the dye industry, and in the synthesis of many drugs.

Formalin, solution obtained from formaldehyde (q.v.) which has great powers of deodorising and preserving various substances. The former fact makes it a particularly unsuitable medium for preserving foodstuffs, where the odour is often the chief check the consumer has upon the good or bad quality of an article; none the less it is largely used on the Continent for this purpose. F. is used in many industries because of its chemical effect upon soft substances, and is also a powerful antiseptic and disinfectant.

Formalism (in philosophy), according to

Kant (q.v.) those qualities and determinants which fix the arrangement of matter, and thus invest a thing with identity. F. becomes a kind of enhanced idealism. Aristotle says that an individual organism has two aspects: matter, out of which he is emerging, and form, into which he is passing. Thus everything is matter, and the potentialities of the individual thing which impel it to its reality are its form. The form is therefore immanent. In reason, matter corresponds to the passive reason, while form is the active reason. In art, form is the 3rd of the 4 causes, material, efficient, formal, and final. Advanced F. actually denies the existence of matter and recognises form only.

In religion F. stands for excessive devotion to formal precedence and observance, as distinct from the spirit.

Formentera, 4th largest of the Balearic Isles (q.v.), lying S. of Ibiza (q.v.). It is hilly in the E., and produces wheat, wine, and salt. The cap. is San Francisco Javier, which has a fortified 18th-cent. church. Pop. 5500.

Formia (formerly **Mola di Gaeta**; anct **Formiae**), lt. port and tourist resort, in Lazio (q.v.), on the Gulf of Gaeta (q.v.), 40 m. SE. of Latina. It stands on the Appian Way (q.v.), and has the remains of Rom. villas, including that of Cicero (q.v.), who was murdered nearby. The tn has sev. fine churches, of which 2 were badly damaged during the Second World War. In Rom. times F. was known for its wines. Pop. 17,700.

Formic Acid, fatty acid, being a derivative of methyl alcohol or formaldehyde. It is a colourless liquid of sp. gr. 1.24; it solidifies at low temps., melting at 3°C . and boiling at 101°C . It has a powerful irritating odour, and blisters the skin on contact. It occurs in nature in nettles, ants, and other stinging creatures, and owes its name to the ant (*formica*), whose irritating sting is due to the secretion of F.A. The molecular formula of F.A. is CH_2O_2 , and the substance may be prepared by heating oxalic acid with glycerin. The salts of F.A. are termed formates and may be prepared by neutralising the A. with the appropriate alkalis.

Formic Ether, or **Ethyl Formate**, ester of F. acid. It may be prepared by treating F. acid with alcohol. Its formula is $\text{H}\cdot\text{CO}_2\text{C}_2\text{H}_5$; it is a colourless liquid with a pleasant peach-like odour, boiling at 55°C . Like many of the esters of organic acids, it is used as a perfuming and flavouring agent in the preparation of sweets, etc. It is also used as an ingredient of a kind of rum.

'Formidable', name of a Brit. battleship. It was torpedoed and sunk by the Germans on 1 Jan. 1915. The present **Formidable** is an aircraft carrier of 23,000 tons displacement, completed in 1940.

Formosa: 1. See **TAIWAN**.

2. Ter. in the extreme N. of the Argentine Rep., South America, lying between the R.s Pilcomayo and Bermejo. The estimated area is c. 23,780 sq. m.; pop. 113,800. F. ter. forms part of the

great Chaco plain. The region is hot and humid; it is covered with forests and large sections are liable to inundations; the summer rains last from Oct. to May. Some cattle are reared, and agriculture is carried on. F. is the chief tn.

3. Cap. of the above, a riv. port and agric. and processing centre, situated on the Paraguay R. It was founded after the defeat of the natives of Chaco by Gen. Victoria in 1884-5. Pop. 17,300.

Formula, in chem., a collection of symbols (q.v.) and numbers which together denote *one molecule* (q.v.) of an element or compound. A molecule of an element is denoted by writing the symbol of the element, and below it to the right a number which expresses the number of atoms in the molecule.

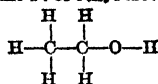
For example, H_2 denotes 1 molecule of hydrogen containing 2 atoms;

S, denotes 1 molecule of sulphur containing 8 atoms.

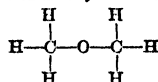
In representing the molecule of a compound the same device is used, but at least 2 symbols must appear since at least 2 elements must be present, e.g. H_2O denotes 1 molecule of water containing 2 atoms of hydrogen and 1 atom of oxygen. The close proximity of these symbols denotes chemical combination between the elements. When a group of symbols is common to a certain class of compounds, it is written as a bracketed group in their formulae with a number to show the number of groups present, e.g. $Cu(NO_3)_2$ for copper nitrate could be written as CuN_2O_6 , but the former indicates the relation of copper nitrate to nitric acid. A number of molecules of a compound is indicated by writing the appropriate number before the compound, and this figure multiplies the whole of it, e.g. $2HNO_3$ denotes 2 molecules of nitric acid containing 2 atoms of hydrogen, 2 atoms of nitrogen, and 6 atoms of oxygen in all. A F. not only stands for 1 molecule of a compound but also represents a definite relative weight (molecular weight) which can be found from the atomic weights (q.v.) of the elements concerned, e.g. H_2SO_4 represents $2 \times 1 + 32 + 4 \times 16$, i.e. 98 parts by weight of sulphuric acid.

A F. which indicates the respective proportions of the elements is an *empirical F.*, e.g. H_2O and H_2O_2 are both empirical formulae for water as the ratio of the weights of hydrogen and oxygen is constant. When the F. of a substance represents the actual numbers of the atoms of each element in the molecule, it is a *molecular F.* Thus H_2O and not H_2O_2 is the molecular F. for water, since 1 molecule of water actually has 2 (and not 4) hydrogen atoms and 1 (and not 2) oxygen atoms. Some compounds have the same molecular F. but different chemical and physical properties. The latter is because the arrangement of the atoms in each molecule is different; e.g. ethyl alcohol and diethyl ether both have the same molecular F., $C_4H_{10}O$, and the disposition of the atoms can be indicated by a *graphic F.*

The graphic F. of ethyl alcohol is



whereas that of diethyl ether is



The same information is conveyed by a *structural* or *constitutional F.* Thus ethyl alcohol is $CH_3 \cdot CH_2 \cdot OH$ whereas diethyl ether is $C_2H_5 \cdot O \cdot C_2H_5$ or $(C_2H_5)_2 \cdot O$. In *electronic* formulae, crosses and dots are often used to indicate the types of electrical bonds between the atoms. Thus the F. $H \times \cdot Cl$ indicates that the bond between H and Cl consists of 1 electron (\times) from the hydrogen and 1 (\cdot) from the chlorine. See also DIPOLES; ISOMERISM; ISOTOPES.

Foro Applo, see FORUM APPII.

Forres, royal burgh of Morayshire, Scotland, 12 m. WSW. of Elgin, on the R. Findhorn. On Cluny Hill is built a tower in honour of Nelson (1807); the 11th-cent. carved stone monument (Sveno's Stone) is the largest single stone monument in the kingdom. Pop. 4700.

Forrest, Edwin (1806-72), Amer. tragedian, b. Philadelphia, of Scottish and Ger. descent. He made his first public appearance in 1820 in Philadelphia in the part of Douglas in Home's tragedy of that name. He crossed to England in 1836 and entered on a season at Drury Lane Theatre, London, where he achieved distinction in the Shakespearian rôles of Macbeth, Lear, Othello, and Richard III. He finally returned to the New York stage, and his last appearance was in 1871. See J. Rees, *Life of Edwin Forrest*, 1838; and L. Barrett, *Edwin Forrest*, 1881.

Forrest, John, 1st Baron Forrest of Bunbury (1847-1918), Australian explorer and statesman, son of Wm F. Educ. at Perth, Western Australia. At the age of 22, after 4 years' service in the State survey dept, he was sent in charge of an expedition to seek for traces of the lost explorer Leichhardt. Five years later he explored the colony of Western Australia from Champion Bay to Port Darwin, being awarded for this and his other journeys the gold medal of the Royal Geographical Society and other honours, together with a large grant of colonial land. On the attainment by Western Australia of responsible gov. for which the colony was largely indebted to his exertions, he became its first premier and held office for over ten years. In his term as premier important gold discoveries were made in Western Australia, and it was to his vision and determination that the colony owed the Fremantle harbour works, the projection of railroads to the mining dists., the gold-fields water scheme, and its excellent land laws. He held many ministerial posts in

the Federal parliament, including those of treasurer and acting prime minister. He pub. *Explorations in Australia*, 1876. See H. G. Turner, *First Decade of the Australian Commonwealth*, 1911.

Forrest, Nathan Bedford (1821-77), soldier, b. near Chapel Hill, Tennessee. On joining the Confederate Army after the beginning of civil war in America, he became a commander of cavalry and did some distinguished service for his country. Military men rank him as one of the greatest of natural cavalry leaders. In the campaign of 1862 he made a dash across the state of Tennessee and for 2 weeks cut Gen. Grant off from communication with the world and seriously delayed the advance on Vicksburg. See lives by J. A. Wyeth, 1904; E. W. Sheppard, 1930; A. N. Lytle, 1939.

Forrester, James Vincent (1892-1949), Amer. statesman, b. Beacon, Dutchess co., New York. F. went to local schools, and then worked as a newspaper reporter; but later went to Dartmouth College and Princeton Univ. He sold bonds for the banking house of Dillon, Read and Company. In 1918 he served in the office of naval operations, in the Navy Dept., Washington, and subsequently as a naval aviator. After the war he returned to his banking house, becoming its president in 1937. F. was nominated by Roosevelt to be under-secretary of the navy—a newly created post, entailing responsibility for all material provided for the navy. Acting-secretary of the navy 1944; secretary a month later. F. was the driving force behind an immense production of ships, planes, guns, and other munitions of war, besides establishing close relations with Britain in solving problems connected with the Lend-Lease Act. In 1947 he was appointed first U.S. secretary of defence, resigning for health reasons in 1949.

Forrester, Alfred Henry (1804-72), writer and illustrator, b. London. He worked under the pseudonym of 'Alfred Crowquill,' contributed drawings to *Punch*, and wrote and illustrated more than 20 humorous books, verse, burlesques, and fairy tales. Among his illustrations are those to the 'Bon Gaultier Ballads,' 1849; 'The Travels of Baron Münchhausen,' 1859; and the works of his brother, Charles Robert F.

Forskål, Peter (1732-63), Swedish botanist. In 1761 he was chosen by the king of Denmark to join the scientific expedition to Arabia, and here he collected sev. hundred plants, previously unknown, and pub. a 'Flora' at Malta. He d. of the plague on his return journey. His papers, etc., were pub. by Niebuhr.

Forst, Ger. tn in the dist. of Kottbus, 14 m. E. of Kottbus (q.v.). It stands on the l. b. of the Lusatian Neisse (q.v.); its former suburb, Zastieki, on the r. b. of the riv., has been Pollitz since 1945. It has chemical and textile industries and an electricity generating station. Pop. 30,000.

Forster, Edward Morgan (1879-), novelist and essayist, b. London. He was

educ. at Tonbridge School and at King's College, Cambridge, of which he became a Fellow in 1927. At Cambridge he made a lifelong friendship with Lowes Dickinson, who with F., Nathaniel Wedd, his classics tutor, G. M. Trevelyan, and others founded the *Independent Review*. F.'s first novel, *Where Angels Fear to Tread*, 1905, was written while he was living in Italy. It was followed by *The Longest Journey*, 1907, *A Room with a View*, 1908, and *Howards End*, 1910. These 'project an exquisite and animated crowd of beings—delicious elderly ladies, priggish or tormented or cheerfully barbarian young men, perceptive or conventional young women, beautifully of their period and class; and all set in the silver-point world of their creator's civilised irony' (Rose Macaulay). *The Celestial Omnibus*, a collection of short stories, appeared in 1911. The last of his novels, and the best known, *A Passage to India*, was begun shortly afterwards, but not completed and pub. until the year 1924. It gained him a wide reputation for the insight and wisdom with which he depicted the relations between the Indians and the Eng. in India. There are many striking passages in his books, while, as a satirist dealing with conventions, he is both penetrating and mordant. The integrity with which F. approached life in his novels has also enhanced the value of his miscellaneous and critical writings. *Aspects of the Novel* was delivered first as the Clark lectures at Cambridge in 1927 and pub. in the same year. A vol. of short stories, *The Eternal Moment*, appeared the following year and included stories such as *The Story of the Siren* which were written much earlier. Other books are *What I Believe*, 1939, *Nordic Twilight*, 1940, and the Rede lecture on Virginia Woolf, pub. in 1942. Contributions to Eng. periodicals in the twenties were collected and pub. under the title *Abinger Harvest*, 1926. In 1937 he was awarded the Benson Medal of the Royal Society of Literature, and in 1953 was made a Companion of Honour. See Rose Macaulay, *The Writings of E. M. Forster*, 1938; L. Trilling, *E. M. Forster*, 1944. Studies of F. also appear in Virginia Woolf's *The Death of a Moth*, 1929; Katherine Mansfield's *Novels and Novelists*, 1930; and Lord D. Cecil's *Poets and Story-Tellers*, 1949.

Förster, Friedrich Christoph (1791-1868), Ger. historian and poet, and brother of the painter Ernst Joachim F., b. Münchengosserstadt. On the outbreak of the War of Liberation, in 1813, he joined the army. On his return to Berlin, he taught in the school of artillery and engineering for a short time, and in 1820 became custodian of the Royal Art Museum with the title of court councillor. F. was connected with various journals, and was the founder and secretary of the *Wissenschaftlicher Kunstverein* in Berlin. His prin. works are *Der Feldmarschall Blücher*, 1821, *Albrecht von Wallenstein*, 1834, and *Wallensteins Prozess*, 1844. He also wrote poems and a drama, *Gustav Adolf*, 1833.

Forster, Hugh Oakeley, *see* ARNOLD-FORSTER, H. O.

Forster, Johann Georg Adam (1754-94), eldest son of Johann Reinhold F., b. Nassenhuben, near Danzig. At the early age of 17 he accompanied his father on Cook's second voyage, and pub. an account of the expedition. He was for sev. years prof. of natural hist. at Cassel and Vilno (Vilna) respectively, and then became librarian to the elector of Mainz in 1788. His writings, of which the most important are *Ansichten vom Niederrhein*, 1791-4, and *Beschreibung einer Reise um die Welt*, 1784, rank high amongst Ger. works descriptive of nature. His *Letters* were pub. by his widow in 1829 (2 vols.). *See* P. Zincke, *Georg Forsters Bildnis im Wandel der Zeiten*, 1925.

Forster, John (1812-76), biographer, b. Newcastle. Educ. at the grammar school there, and at Univ. College, London, he became a barrister of the Inner Temple, but soon gave up law for literature. At the age of 20 he was appointed dramatic critic to the *True Sun*, and 2 years later ed. the short-lived *Reflector*, to which his friends Lamb and Leigh Hunt contributed. During this period he did much journalistic work, but his ambition was to write books, and between 1836 and 1839 he wrote the *Lives of the Statesmen of the Commonwealth*. In 1846 he was for a few months editor of the *Daily News* in succession to Dickens, and in the next year he became editor of the *Examiner*. His admirable *Life and Adventures of Oliver Goldsmith* appeared in 1848. Being appointed in 1855 secretary to the Commissioners of Lunacy, he at once gave up journalism, and devoted himself to more serious labours. Among his close friends were Carlyle, Dickens, and Landor. His best-known work is his biography of Dickens, 1872-4, which, in spite of many defects, still ranks as a standard authority. He also wrote lives of Landor, 1868, Sir John Eliot, and the first vol. of a life of Swift. *See* P. H. Fitzgerald, *John Forster, by one of his Friends*, 1903; and R. Renton, *John Forster and his Friendships*, 1912.

Forster, William Edward (1818-86), politician, b. Bradpole, Dorset, of Quaker ancestry. He became a successful woolen manufacturer in Bradford. He became Liberal member for Bradford in 1861, and held the seat until his death, in 1865 being appointed under-secretary for the colonies. He became vice-president of the Council 3 years later, and was given charge of various Bills, which he piloted successfully through the House. Upon Gladstone's return to power in 1880 he became chief secretary for Ireland, but resigned in 1882, later declaring his opposition to Home Rule. *See* life by T. Wemyss Reid, 1888.

Forsyth, Alexander John (1768-1843), inventor, b. Aberdeenshire. After the death of his father he became the minister of Belhelvie, Aberdeenshire, and about the year 1806 invented the percussion lock, which secret Napoleon offered to buy for £20,000, but was refused. *See*

Sir A. J. Forsyth Reid, *The Rev. Alexander J. Forsyth and his invention of the Percussion Lock*, 1909. *See* also FIRE-ARMS.

Forsyth, Andrew Russell (1858-1942), mathematician, b. Glasgow, educ. at Liverpool College and Trinity College, Cambridge. He became prof. of mathematics at Univ. College, Liverpool, 1882-3, and Sadlerian prof. of pure mathematics at Cambridge, 1895-1910. Chief prof. of mathematics, Imperial College of Science and Technology, South Kensington, 1913-23. F.'s chief work was *Theory of Differential Equations*, 1890-1906.

Forsythia, or Golden Bell. Deciduous shrub, genus, family Oleaceae, blooming early in advance of the leaves, and with yellow flowers. *F. ovata*, *F. suspensa*, *F. viridissima*, and *F. x intermedia* and its variety *spectabilis*, are popular species of these E. Asian shrubs.

Fort, *see* FORTIFICATION.

Fort Augustus, vil. on the Caledonian canal at the head of Loch Ness, 33 m. SW. of Inverness. It was built in 1716, under the name of Kilohurmin, and captured by the Jacobites in 1745. After the battle of Culloden it was reoccupied and received its present name in honour of Wm Augustus, duke of Cumberland, the victorious general. Here is a Benedictine abbey and school of the Eng. Congregation. Pop. 1130.

Fort Beaufort, dist. in the SE. of the prov. of the Cape of Good Hope. Its cap. is F. B., which lies 45 m. W. by N. of King William's Tn. Pop. of dist. 20,000.

Fort Collins, city, cap. of Larimer co., Colorado, U.S.A., c. 55 m. N. of Denver. Altitude 5100 ft. It is the shipping and trade centre for a livestock and irrigated sugar-beet region; it has flour, dairy, and meat products, and manufs. bricks, tiles, woollen goods, and machinery. The city is the site of the Colorado Agric. and Mechanical College. Pop. 14,937.

Fort Dodge, city, cap. of Webster co., Iowa, U.S.A., on the Des Moines R., 70 m. NNW. of Des Moines, in an agric. area with valuable deposits of gypsum, coal, and clay. Industries include meat packing, creameries, gypsum mills, bricks and tiles, and soy-bean processing. The Blanden Memorial (art gallery) is here. Pop. 25,100.

Fort Garry, *see* WINNIPEG.

Fort George, fortress (depot of the Seaforth Highlanders) in Inverness-shire, Scotland, at the mouth of the Moray Firth.

Fort Hamilton, residential section of Brooklyn bor. of New York. Here is the U.S. fort (1831), on the Narrows opposite F. Wadsworth, Staten Is.

Fort Johnston, Nyasaland, at the spot where the R. Shire flows from Lake Nyasa. Owing to the rise of the lake level it is possible that the Shire R. may become navigable as far as Mpimbe, which would increase the importance of F. J.

Fort Lee, bor. of New Jersey, U.S.A., lies on the W. bank of the R. Hudson,

opposite the N. part of New York, of which city it is a residential suburb (George Washington Bridge connection). It received its name in honour of Gen. Charles Lee, being originally a fortification erected by the Americans early in the War of Independence. Held in 1776 by Gen. Greene, it was abandoned by him on the advance of Lord Cornwallis, and an attempt to recover it in 1780 failed. F. L. manufs. metal products, furniture, and baby carriages, and was an early centre of the motion-picture industry. Pop. 11,648.

Fort Madison, city in Iowa, U.S.A., on the Mississippi R. (bridged) 17 m. SW. of Burlington. It manufs. fountain pens, ink, mechanical pencils, farm tools, signal flares and lamps, food products, and paper. Pop. 15,000.

Fort Panmure, or **Rosalie**, *see* NATCHEZ.

Fort St George, *see* MADRAS.

Fort Smith, city of Arkansas, U.S.A., cap. of Sebastian co.; it is situated on the Arkansas R., 140 m. NW. by W. of Little Rock. It is the chief manufacturing centre of the state. Its products include furniture, glass, textiles, bricks, tin cans, wood and paper products, vehicle bodies, stoves, and buckets; zinc smelting and petroleum and natural-gas processing are also carried on. Coal mines and hardwood are in the region. Pop. 47,942.

Fort Sumter, fort in Charleston harbour, South Carolina, about 4 m. from Charleston. Here the first Civil War engagement took place in 1861, when the Federals under Maj. Anderson surrendered to the Confederates. In 1865, at the fall of Charleston, F. S. was captured by the Federal fleet. It became a national monument in 1948.

Fort Victoria, oldest settlement in Southern Rhodesia, on main N. to S. road, 180 m. from Beit Bridge; centre of an important ranching area and near the famous Zimbabwe Ruins (q.v.). Pop.: Europeans 1200; Africans 5000.

Fort Wayne, city, cap. of Allen co., Indiana, U.S.A., an important railway centre, 148 m. from Chicago. It manufs. electrical appliances, farm and mining equipment, radio and electronic equipment, etc. It has a Catholic cathedral and is the seat of F. W. Art School and Museum and Indiana Technical College. Pop. 133,600.

Fort William: 1. Tn of the co. of Inverness, Scotland, near the head of Loch Linnhe, at the S. end of the Caledonian Canal. The fort was built in 1665 by Gen. Monk; rebuilt in 1690; besieged by the Jacobites in 1746, and demolished in 1890 to make room for a railway station. For many years F. W. was the key of the Highlands, and is now a well-known centre for tourists and mt climbers. Ben Nevis, 4406 ft, the highest mt in Great Britain, is 3 m. SE. of the tn. Pop. 3 00.

2. City of Ontario on the delta of the Kaministiquia R., on the shores of Lake Superior, Canada, 600 m. NW. of Toronto; has one of the finest land-locked harbours in the world. The city has 10 parks, the largest, Chippewa Park, having 3 m. of shore line on the lake. F. W. has a fine

library, collegiate school, and vocational school; all public utilities are municipally owned. It is on the Canadian National and Canadian Pacific railways, and there is a good airport 4 m. distant. Its chief business activities are railways, shipping, grain elevators and allied waterfront undertakings, paper and pulp mills, general timber operations, water power, steel products. It is the greatest coal-handling centre in Canada, having handled 2,500,000 tons in 1948. Originally settled by Fr. fur traders in 1678 as F. Kaministiquia, it was renamed F. W. in 1806. Notable as ann. meeting-place of old 'fur brigades' from far W. and N. with Hudson's Bay Company's dealers from Montreal. Incorporated as a city in 1907. Pop. 37,630.

3. Calcutta (q.v.), name given to 3 vils. conferred upon the East India Company in 1700 by the Emperor Aurungzebe. They were immediately fortified, and received their name in honour of William III.

Fort Worth, city of Texas, U.S.A., cap. of Tarrant co., on Trinity R., 30 m. from Dallas. It is on the Missouri, Kansas and Texas, Texas and Pacific and other railways. There are flour and grist mills, machine shops, foundries, and tanneries. Manufs. include flour, woolen and cotton goods, cotton-seed oil, agric. implements. F. W. is the seat of a polytechnic college, a univ. (Texas Christian Univ., founded in 1873), and a medical college. It has also a court-house, a city hall, and 2 theatres. Pop. 279,000.

Fortaleza, the cap. of the state of Ceará (q.v.), NE. Brazil. It is a seaport, being situated on a protected roadstead, though vessels cannot anchor very far into the harbour. The tn itself is well laid out, and is connected by rail and air with the interior regions of the country, which are much more fertile than its environs. F. trades principally in coffee, cotton, hides, sugar, rubber, oilseed, and drugs. Pop. 270,150.

Fortescue, Adrian (1874-1923), Eng. Catholic priest, scholar, orator, and artist; son of former provost of St Ninian's, Perth, who was received into the Catholic Church. Educ. at Jesuit preparatory school, Boulogne; St Charles College, Bayswater; Scots College, Rome; Innsbruck Univ. An exceptional linguist, he studied Hungarian, Arabic, Syriac, Russian, as well as the more regular Hebrew, Greek, Italian, German, and French. At Innsbruck he prescribed for himself in due course Sanskrit, Icelandic, and O.E.—'If God spares me.' Learnt Flem., 1915, and preached fluently in that tongue to Belgian war-time refugees. A vivid and powerful personality, as interested in action as in literature, he wrote and drew standing at his desk. Fought at least twice for his life, with fanatics or brigands in E. Europe. Held pastoral posts at Ger. Church, Whitechapel, 1899; Chipping Ongar, Colchester, Enfield, Witham, and Maldon. In 1907 F. was appointed to the charge of the Catholic community at the new garden city, Letchworth, which he

held for his last 16 years. He lectured, talked, and debated with startling ease, force, and charm on a wide variety of linguistic and scholarly subjects. Among his many pub. works are books on the Gk Fathers and the Orthodox Eastern Church; *Liturgy of St John Chrysostom*, 1908; preface to Thomas à Kempis's *De Imitatione Christi*, 1919, and *Roman Missal*, 1920, *The Mass*, 1920; *The Ceremonies of the Roman Rite*, with designs by the author, 1920; *Histoire des Patriarches d'Alexandrie* (par Jean Maspero), revu par A. Fortescue and G. Wiet,

him. At the accession of Edward IV, F. was charged with high treason, and accompanied Queen Margaret and her court in exile to Holland. He afterwards returned to England and received a pardon from Edward IV on the defeat of the Lancastrian party. F.'s fame rests on his works, *De laudibus legum Angliæ*, written c. 1470 (printed 1537) for the instruction of the young Prince Edward, and *On the Governauce of the Kingdom of England* (printed 1714). See Lord Clermont, *History of the Family of Fortescue* 1869.



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THE FORTH BRIDGE FROM SOUTH QUEENSFERRY

1923. Pamphlets: *How to Pronounce Latin*, 1908, *Pope Gregory VII*, 1909, *The Branch Theory*, 1910, *The Vestments of the Roman Rite*, 1912, *Formual of Hormidas*, 1914, *Russia and the Catholic Church*, 1915, *Pacifism*, 1916, *Date of Anglican Schism*, 1917, *Catholic because Roman Catholic*, 1917. See Adrian Fortescue, memoir by J. G. Vance and J. W. Fortescue, illustrated with his illuminated penwork, 1924, and R. L. Hine, *Confessions of an Un-common Attorney*, 1946.

Fortescue, Sir John (c. 1394–c. 1476), b. Somerset and educ. at Oxford. He was 3 times appointed governor of Lincoln's Inn during Henry VI's reign, and in 1442 was chief justice of the king's bench, being highly recommended for his wisdom, gravity, and uprightness. He was a great favourite with Henry VI and held office during the remainder of his reign, faithfully serving and steadily adhering to

Fortescue, Sir John William (1859–1933), military historian, a son of the 3rd Earl F. Librarian at Windsor Castle, 1905–26. Author of *History of the British Army*, 1890–1930, a monumental work in many vols. Other pubs.: *History of the 17th Lancers*, 1895, *Wellington*, 1925, *The Empire and the Army*, 1928, *Six British Soldiers*, 1928, *The Royal Army Service Corps*, 1930.

Forteventure, see FUERTE VENTURA.

Forteviot, vil. of Perthshire, Scotland, on the R. Earn to the SW. of Perth. The old tn of that name, which was close by, was the cap. of the Picts and Scots. Pop. 450.

Forth, see CARNWATH.

Forth, Scottish riv., formed by the union of 2 headstreams, the Duchray Water and the Avonduh, which drains Lochs Chon and Ard. Rising on the NE. side of Ben Lomond, the F. flows E.

joining the Laggan or Avondhu (Perthshire) just above Aberfoyle. The 12½ m. between Stirling and Alloa are known as the 'Links of Forth,' from the many picturesque windings. The riv. then expands into the arm of the North Sea called the Firth of F. (Bodotria, Boderia, Aestuarium, Scots Water). The riv. is about 107 m. long, reaching Stirling after a picturesque course of 39 m., instead of a direct one of 18 m. Its chief tribs. are the Teith, draining Lochs Katrine, Achray, Vennachar, and Lubnaig (by means of the Leny), the Allan Water, and the Devon. The riv. and, lower, the firth divide the shires of Perth, Clackmannan, and Fife on the N. from Stirling, West Lothian, Midlothian, and East Lothian on the S. The riv. is navigable for vessels of 100 tons up to Stirling, and for vessels of 300 tons to Alloa. Grangemouth on the F. is connected with Bowling on the Clyde by the F. and Clyde Canal, about 38 m. long, on which Symington tried his first steamer in 1801-2. The firth is a bay-like extension of the riv., about 50 m. long, with an average breadth of 2½ m. (as much as 17 m. wide at Prestonpans). At Queensferry it is only 1 m. across, and is spanned by a cantilever railway bridge. 8295 ft long, with 2 main spans of 1710 ft each, built between 1882 and 1890. The firth is from 3 to 37 fathoms deep, and has good harbours, St Margaret's Hope being one of the safest Scottish roadsteads. Rosyth, near by, became a naval base in 1903. The Bass Rock and the Isle of May are at the entrance to the firth, which encloses the is. of Inchcolm (with a ruined monastery), Cramond, and Inchkeith (with a lighthouse, as has also the Isle of May). The chief rvs. flowing into the firth are the Carron, Avon, Almond, Water of Leith, Esk, and Leven. Its chief port is Leith, the port of Edinburgh. Others are Granton, Bo'ness, Grangemouth, and Kirkcaldy. Salmon and herring fisheries are carried on in the F.'s basin, and white fish abound. There are vast deposits of coal beneath the bed of the firth, already worked by the Fife collieries. There are various places of historical interest on the riv.'s banks, amongst them Stirling (once a royal residence), Cambuskenneth, Alloa, Kincardine, and Aberfoyle. Falkirk, near by, has the remains of the wall of Antoninus, and Carberry Hill and Loch Leven, noted in the hist. of Mary Queen of Scots, are not far distant. Bede (d. 735) called the firth *Sinus orientalis*; to Nennius (A. 796) it was the *Mare Friesicum*. *Consult* Dick, *The Pageant of the Forth*, 1910.

Forth and Clyde Canal, canal 38 m. in length by means of which the R. Forth communicates with the Clyde. It extends from Grangemouth on the E. to Bowling, Dumbartonshire, on the W., and divides the country at its narrowest part. It was completed in 1791.

Fortification, 'the art or science of fortifying places in order to defend them against an enemy.' F. may definitely be divided into 3 parts: first, permanent F.s which have been continually built in

time of peace to defend some vulnerable point in the defences of a country. Much time and labour have been given to this, as, especially on the Continent, the permanent F.s formed a most essential part of a country's defences. Mobility in war, as in the Second World War, and the coming of nuclear weapons have largely made permanent F.s obsolete. Secondly, semi-permanent F.s, such, for example, as are erected when war seems to be imminent and care is being taken to see that all points of the defence are made secure. Thirdly, field F.s, e.g. such military works as are constructed by military engineers during a campaign which have no real permanence and which are only of value during the campaign itself. Such works are built to strengthen the position taken up by an army and to provide as many obstacles as possible to the attacks of the enemy. Field F.s reached an extraordinary pitch of development in the First World War (see e.g. HINDENBURG LINE; HOHENZOLLERN REDOUBT).

During the early stages of military hist. defence was stronger than attack. The main weapons of attack were the battering-ram and the catapult. This latter weapon hurled a variety of missiles at the walls of the place attacked. Obviously, then, the best means of defence against attacks of this kind was the building of huge walls. These, which often attained a thickness of 30 to 40 ft, were practically impregnable, and to this fact the medieval baron owed a great deal of his power. It was obviously impossible for the king to take the castle save by a long siege, and the time expended on such a proceeding was not sufficiently compensated for by the result. The great curtain wall of the castle was commanded by huge towers at each corner, which prevented the enemy from easily attacking the walls, since they could be met by a front and flank defence. Up to the time of the Renaissance the castle may be regarded as the chief method of F. The invention of gunpowder did not immediately bring with it the abolition of the castle. At first the difficulties of firing and the poor ammunition used (usually stone balls) caused little or no damage to the fortified places, but with the invention and customary use of cast-iron cannon balls, the superiority of the fortified places over the army of attack came to an end. The classic example is the rapid success of Charles VIII of France during his attack upon the fortified places of Italy. Before his artillery these places fell rapidly, and new means had to be adopted to prevent the enormous damage done by the artillery fire. Mounds of earth began to replace the towering walls of the forts, and these mounds were protected by means of wide, deep ditches. The depth was usually 20 to 30 ft, and the ditches were strengthened with masonry (revetments). The face of the castle also began to alter, and the 16th cent. saw the erection of great bastioned fortresses. The enemy naturally massed

their artillery together when besieging a fortress in order to breach the curtain wall the more easily.

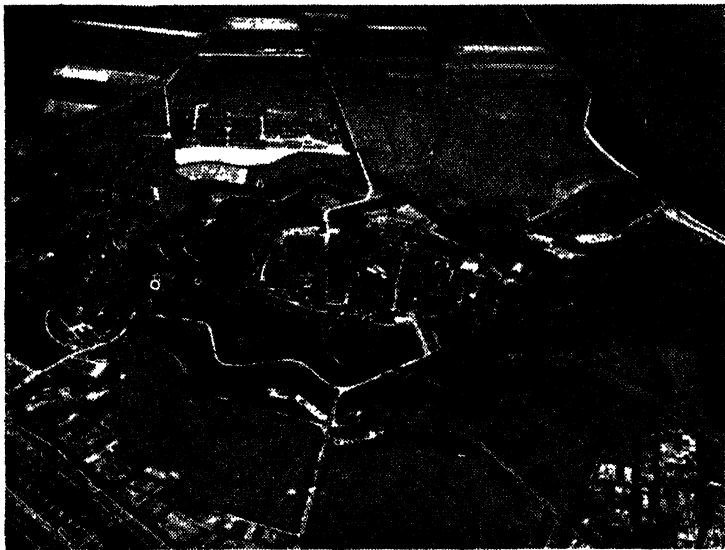
The bastion (q.v.) consisted of 2 faces and 2 flanks, and a cross fire was able to be poured on to the massed artillery of the enemy from the face of the bastion, whilst at the same time from the flank of the bastion the curtain wall could be easily defended. The enemy could also be attacked by a direct fire from the curtain wall. The attacking army gradually altered its tactics. Instead of attempting to breach the curtain wall, it began to attack the bastion itself. The usual point of attack was the salient angle of the bastion—that is, the angle formed by the meeting of the 2 faces of the bastion itself. Ravelins or outworks which commanded the position of the attacking artillery were consequently added in order to counter this form of attack, and under the great engineers of the 16th and 17th cents. the outworks of the bastions were extended until they became what can best be described as a step-by-step defence, i.e. the garrison resisted to the best of their ability until forced to retire from the outer line, when they fell back on the next line, resisting all the time. The names of famous engineers during this period are legion, but probably the greatest of all names is that of the Fr. engineer, Sébastien le Prestre de Vauban. The art of war underwent some considerable modification during the 17th and 18th cents., but in no essential feature did it actually change. The sieges of the Napoleonic wars were conducted on very similar lines to those of Marlborough's campaigns, but with the end of these wars a change was brought about. The range of the artillery was rapidly increasing; the distance from which it was effective had increased to half a m. It became obvious, therefore, after the Napoleonic wars that the guns of the besiegers must be kept at a greater distance. The enceinte, i.e. the line of F.s forming the chief works of a fortified place, must be more amply defended. To do this fortresses were built some distance from the enceinte and yet sufficiently close to one another to be able to give support when attacked. Each of these smaller fortresses was self-sufficient, i.e. it was adequately garrisoned and adequately provisioned so that if necessary it could stand a siege by itself. These fortresses were built on much the same plan as was used for the larger fortresses themselves. The introduction of rifled artillery fire caused stonework F.s which were exposed to artillery to be condemned. The Franco-Prussian war and the siege of Paris proved the uselessness of the fortress defended by bastions. Fortresses were thrown out to greater and greater distances to prevent the direct attack of the enemy on the enceinte. This in itself made it necessary that the besieging army should increase in proportion to the distance to which the protecting fortresses were thrown out, since the zone to be invested by the besieging army had become

much greater. The main lines which modern F.s followed up to the Second World War, however, were: that in the first place the girdle of fortresses should be thrown out to such a distance that direct bombardment of the place could not occur. Secondly, that the guns in the fortresses should be protected by armour, but that the bulk of the defending artillery should be outside the defended fortress. Thirdly, that the defence should depend to a very large extent upon the infantry, and that for this purpose the forts should be connected one to another by means of infantry entrenchments. Fourthly, that the lines of communication should be kept open and well guarded between the main fortress and the girdle of defensive fortresses. The guns outside the fortresses were either to be concealed or protected by means of cupolas, and the entrenchments of the infantry should be bomb-proof. The strength of a fortified position depends upon its communications, the rapidity with which the defending infantry can co-operate, and the concealment of its guns. The famous Maginot line, extending from the Swiss frontier to Verdun, was pre-eminently a combination of passive obstacle and active defence. Its construction marked the abandonment of the 1914 conception of the *offensive à outrance*, which led to such tragic results in the First World War. Galleries were hollowed out which, in a straight line, would cover the distance from Paris to Liège, and the whole work cost 7,000,000,000 francs. The towers of the subterranean workings, which weighed 120 tons, were monolithic, and no shell could penetrate their concrete walls. Defence against gas was assured by a special process. In order to do away with loop-holes, the guns in the turrets pivoted on a ball mounted in the armour plate. Artillery officers saw the outside world through panoramic telescopes built into the armour plate. Telephone lines were buried 5 metres deep in concrete slabs. The 'zone of fire' was protected by look-out posts, alarm signals, sound-locating posts, and barrages of infra-red rays. The big forts were nothing less than buried barracks with kilometres of passages lit by electricity and provided with metalised tracks. They were habitable for months on end. The Maginot line conformed to the formula of Marshal Pétain (q.v.): 'The minimum of danger, the maximum of comfort.' Behind their cusped embasures the men of the Maginot line could literally have covered the frontier zone with a sheet of fire through which no infantry could possibly have advanced. That, at all events, was what was claimed for these F.s. Their cardinal defect was that the line was not prolonged to the coast. Its strength for defence was never tested in the operations of 1940, for the Germans broke through the allied lines at Meas-tricht, and outflanked the line. In the operations of 1944, when the Anglo-Amer. armies advanced on Germany, the enemy was favoured by the advantages accruing from his strong defensive lines, first the

Siegfried F.s (q.v.), and behind them the great barrier of the Rhine. The Maginot line, as such, was no integral part of his defence. *See also* WESTERN FRONT IN SECOND WORLD WAR.

Field Fortification.—The differences between permanent, semi-permanent, and field F.s were a century ago very much more strongly marked than they are at the present time. Nowadays no masonry defences are necessary to make a place defensible, and in a short time, with surprisingly little material, very strong F.s

ate bomb-proof shelters and parapets has been made practically useless, since no military work can be thrown up in a short time which is able to resist the highly explosive shell which is fired nowadays. Thirdly, the most important point of all is to obtain a concealed position. This is an additional reason why parapets are made nowadays comparatively low, seldom, if ever, exceeding 18 in. in height. Fourthly, although obstacles are still used and created, i.e. wire entanglements, pits, and abatis, these are gradually falling



K.L.M.

THE FORTIFIED TOWN OF NAARDEN, NETHERLANDS

Beyond the town, on the right, is the shore of the IJssel Meer (Zuyder Zee).

can be made. The elementary field F.s, such as the use of obstacles for defence, have been known practically since the dawn of hist. Trenches, abatis, and stakes have always formed a part of the protective measures of even savage tribes. But the art of field F. has undergone tremendous changes during the last century. Practically up to the present time the great object aimed at by field engineers was to obtain command and to defend by obstacle; nowadays military engineers aim at obtaining concealment and protection. The main points to be noticed in modern field F.s are that the works erected are adapted to the ground which is being defended. The line of the trenches usually follows the natural line of the hill and valley on which they are erected. Secondly, the erection of elabor-

more and more out of use, but they are still of considerable value when stopping the rush of the enemy, and give the defender an opportunity of attacking the enemy while he is labouring under difficulties. Another object of field F. is to give the enemy as little shelter as possible. With this object the ground in front of the position to be defended is cleared as far as possible to the limits of the range of fire. The outstanding military lesson from the 2 world wars is that it is practically useless to depend on permanent works of defence constructed some years before a campaign, because the continual progress of scientific and industrial development in relation to offensive weapons more than counter-balances the military value of such works. Liège, with its 12 forts in a perimeter of over

30 m., fell within 9 days. As the ground between the forts had not been provided with field defences or obstacles, the Ger. infantry were in the city before the forts had fallen. Namur fell in a similar manner, the forts being literally blown to pieces. The Ger. bombardment opened 20 Aug. 1914, and all forts were destroyed by the 25th. The defence of Antwerp was carried out on different lines from that of Liège and Namur. Although the Germans soon demolished the forts they had also to contend with a defensive trench line held jointly by some Belgian forces and a Brit. naval div. along the R.s Nethe and Rupel. Sev. attacks were made on the Nethe line, but were all repulsed, until the Germans secured a crossing on 6 Oct. Although the steel and concrete forts and works fell in 4 days, the trench line held out for 6. Maubeuge was similar to Antwerp. Here the commander constructed field works well in advance of the permanent works, and although the forts were swiftly destroyed, the field works held the Germans in check for over a week, a delay which had an important bearing on succeeding events, because it held up 60,000 Ger. troops and deprived von Kluck of facilities for supplying his command in its advance to the Marne. Verdun was mainly a repetition of Maubeuge as regards methods of defence. Confidence was not placed in the great forts, but during the winter of 1914-15 a new defence line was constructed some m. beyond the outer line. This line was eventually forced back to within 4 m. of Verdun, but it covered the most important points. *See also* VERDUN.

Some of the new features that have affected F.s are *Aircraft*, which can locate works hidden by rising ground and can bomb at practically any distance in the theatre of operations; *Artillery*—long-range heavy guns can be made mobile by mounting on tracked armoured vehicles and railways; *Camouflage* (q.v.) can be used by both sides, i.e. to hide works and also to screen guns.

Concrete 'pill-boxes' were an undoubted success in the First World War. They could resist a direct hit by a 6-in. shell and were usually too small and well concealed to be hit by large shells. The use of gas by an attacker can render areas in F.s virtually ineffective for sev. days, according to the type and quantity of gas used.

Field Fortifications and Tactics in the Second World War.—With the development of tanks and aircraft after 1918 and of deep infiltration as a basic tactical principle, attack, which had been much more costly than defence, became cheaper than defence in lives and material, and, in consequence, fortified posts held by machine-gun fire were overrun by *blitzkrieg* methods. Protection in the Second World War was no longer mainly given by earthworks; it was mainly given by armour and invisibility. In 1918 tanks won a great war; by 1938, with their increased speed and offensive power, they revolutionised warfare and outmoded

many former conceptions of F.s. The development of planes was no less decisive. As a flying artillery, planes could do what guns used to do in Napoleon's day—open a breach in the enemy's field F.s for decisive manoeuvre. The modern tank, combined with swiftly-moved lorry-borne infantry, produced a new type of force, capable of a strategic infiltration that was the essence of the war by the end of 1941. Mechanisation gives the blitz attack the power to penetrate almost any linear defences, because it gives the power to concentrate spearhead forces of half a dozen divs. on a m. or two of front. But another form of defence, a non-linear form, was also demonstrated in the Second World War, especially on the Russian front. This is the form known as 'web defence,' of which the basis was the holding, not of consecutive lines, but of is. or strong points of resistance, or 'hedgehogs,' capable of all-round defence, and also of continued fighting for long periods after they have been surrounded. This form of defence was learned in the Russian Civil war, in which the rapidly-moving fronts and partisan or guerrilla fighting crystallised around positions defended in isolation, and particularly around tns, vils., and other road centres. These defensive tactics were borrowed from the Ger. methods in the First World War, the system of defence by strong point; but in the Ger. invasion of 1941 the Russians developed the system to a much greater depth of defence with much more reliance on the fortified strong point, with the result that each blitz offensive by the Germans was less of an actual victory and more of a stalemate. One of the essential features in any modern system of defence, especially in web defence, is the use in F.s of an immense number of land-mines. In the Russian and Libyan campaigns both sides used land mines in quantities never before employed. Indeed the Brit. defences in Libya, like those of Rommel earlier in the campaign, consisted largely of vast mine-fields, and Ger. offensive tactics consisted in opening breaches through the mine-fields and forming, with armoured forces, a *kessel* or cauldron to attack the defending troops in the rear and so widen the gap. The tactics of the phalanx or spearhead of tanks in the blitz attack were shock tactics, since the tanks tried to get to close quarters with the enemy as quickly as possible, using projectile weapons at short ranges; and this was effective against troops deployed in linear positions. But when troops were deployed defensively in fortified tns and vils., into which the tanks could only penetrate at great risk, and in is. of resistance or 'hedgehogs' bristling with weapons in all directions and either naturally tank-proof or made proof against direct tank assault by the use of deep mine-fields, tanks could no longer employ shock tactics in the same way and the pendulum began to swing back from shock towards fire, the tank being armed with an artillery piece equivalent in size

to a field gun. During 1942 the *blitzkrieg* won full successes only against obsolete field F.s; against the modern methods of defence shown in Russia it could only prevail at greatly increased cost. Another method of nullifying F.s is by the use of airborne troops dropped behind the enemy's defences, the logistic problem being solved in the same way, namely by airborne supplies. In a period dominated by armour and mobility it is impossible for infantry to protect themselves on the battlefield mainly by entrenchment. Their chief protection becomes invisibility, and this is the first reason why the methods and tactics of modern infantry in the Second World War were largely approximated to those of guerrillas; for a guerrilla force is essentially invisible, strikes from the void, and retires or scatters to disappear after it has struck its blow. See also ENTRENCHMENT. See Sir G. Clarke, *Fortification*, 1907; H. Plessis and E. Legrand, *Manuel complet de fortification*, 1900; O. Micksche, *Blitzkrieg* (trans.), 1941; T. Winttingham, *Weapons and Tactics*, 1943; and S. Toy, *A History of Fortification*, 1955.

Fortiguerra, Niccolò (pseudonym Carteromaco) (1674-1735), It. poet and bishop, b. Pistoia. His best remembered work is *Il Ricciardetto* (first pub. in Paris in 1738), a comic epic, parodying Pulci, Bolardo, and Ariosto. See F. Camici, *Notizie della vita et delle opere di Niccolò Fortiguerra*, 1895.

Fortitude Valley, site of the first settlement in Brisbane, Queensland, Australia, and now a busy commercial and shopping centre of that city.

'Fortnightly', periodical, estab. in 1865 by Anthony Trollope, under the title *Fortnightly Review*, for expression of the political and social views of the philosophical Radicals. It became a monthly very early in its career, and in 1934 its title was changed to *Fortnightly*. It was incorporated with the *Contemporary Review* in Jan. 1955.

Fortnightly Nutation, see NUTATION.

Fortrose, burgh of Ross and Cromarty, Scotland, on the Moray Firth, 10 m. N.E. of Inverness, consisting of 2 tns, Rosemarkie and the anct tn of Chanonry. There is a harbour, and the ruins of a red sandstone cathedral (13th and 14th cents.) are near by. F. is a summer resort for golf and bathing. Pop. 900.

Fortuna, or **Fortune**, It. goddess, originally of fertility, but later identified with the Gk Tyche (Chance). With no reference to law, entirely at her pleasure, she dispensed joy or sorrow indifferently, unlike Fate, the goddess of destiny. F. had temples at Smyrna, Corinth, Elie, Antium, and Praeneste, and in the last, 2 statues of her were oracular. She is represented with a rudder, cornucopia, ball, wheel, or wings.

Fortunate Isles: 1. Another name for Canary Is. (q.v.).

2. See ISLES OF THE BLEST.

Fortunatus, hero of a popular collection of tales, centring on the adventures of F. and his son, with their inexhaustible

purse and wishing-cap, the moral being that worldly prosperity alone is insufficient to produce lasting happiness. The book originated about the end of the 15th cent., though some of the legends included are of older date still. The oldest printed ed. now extant bears the date 1509. Versions of the story have appeared in German, Fr., Italian, Dutch, Eng., Dan., Swedish, and Icelandic. The story was dramatised by Hans Sachs in 1553, and by Thomas Dekker with the title *Old Fortunatus* in 1600. An unfinished narrative poem of the tale, entitled *Fortunatus and his Sons*, was left by Ludwig Uhland. See W. V. Schmidt, *Fortunatus und seine Söhne*, 1819; and H. Günther, *Fortunatus*, 1914.

'Fortune', an elaborate, illustrated monthly magazine primarily for business owners and executives, founded at New York in 1930 by Henry R. Luce. Its articles, on business and economic subjects, are based on thorough and extensive research and are written by members of the staff.

Fortune-telling. Under the Vagrancy Act of 1824 in England anyone pretending to tell fortunes is liable to imprisonment as a disorderly person, but prior to this date the telling of fortunes by palmistry, astrology, or other forms of divination was not an offence against the law. The arts of divination are of great antiquity. See DIVINATION and PALMISTRY.

Fortuny y Carbó, Mariano José Bernardo (1839-74), Sp. painter and etcher, b. Reus, Catalonia. He studied at the academy of Barcelona, and at Rome. During the Sp. war against Morocco, F. followed the army to Africa and filled his portfolios with studies of local life. F.'s work is distinguished by a superlative facility of execution. He specialised in a minutely treated *genre*, as in his 'The Trial of a Model,' of a kind nowadays dismissed as trivial. A large number of his works are in America, both in public and private possession. See C. Davillier, *Fortuny, sa vie, son oeuvre, sa correspondance*, 1876; and lives by C. Yriarte, 1886; E. Calvi, 1911; and J. Clervo, 1920.

Forty, cardinal number equivalent to 4 tens, denoted by the symbols 40 or XL. From time immemorial this number has apparently been regarded with superstitious veneration by both Jews and Muslims, and figures largely in the Bible and in Mohammedan writings. See notes to W. A. Clouston's *Group of Eastern Romances and Stories* (privately printed, 1889) for Biblical references. Muslims mourn F. days for their dead, and consider women ceremonially unclean until F. days after childbirth. Similarly the number F. appears repeatedly in Muslim fiction, as in the Arabian *Tale of the Third Calender*, or *Aladdin and his Wonderful Lamp*, or the Persian romance of *Nasir*. Gangs of robbers in E. tales usually number F. (cf. *Ali Baba and the Forty Thieves*). In Wales F. loaves of bread and F. dishes of butter commonly occur in records of rent paid to the bishop of Llandaff. A bard's fee for his song

was 40d. if a disciple, twice 40d. if a master. Ships suspected of being infected with cholera or any infectious disease are placed under quarantine, forbidden to land passengers or cargo, for F. days. The privileges of sanctuary lasted F. days. There is a popular superstition that St Swithin's Day is followed by F. days of either rain or sunshine.

'Forty-five' ('45), The, term employed by modern writers for the year 1745 and the Jacobite rising under Prince Charles Edward, 'the Young Pretender,' or 'Bonnie Prince Charlie,' which was crushed at Culloden Moor, 1746. *See*

Appian Way among the Pontine marshes, 43 m. SE. of Rome. A canal started from here, running S. nearly to Terracina. *See* Horace, *Satires*, I. v. 3; Acts xxviii. 15.

Forum Cornelia, *see* IMOLA.

Forum Julii, *see* FREGUS; FRIULI.

Forum Livii, *see* FORLÌ.

Forum Neronis, *see* LODÈVE.

Forum Sempronii, *see* FOSSOMBRONE.

Foscardi, Francesco (b. c. 1372), doge of Venice (1423-57). In early life he was guardian of the young marquis of Mantua, and won fame as one of the procurators of San Marco. As doge he waged numerous wars against Filippo Maria Visconti, duke of Milan, and other It. princes, securing



THE FORUM ROMANUM

E.N.A.

D. Nicholas, *Prince Charles and the '45*, 1949; and Sir C. Petrie, *The Jacobite Movement: the Last Phase*, 1950.

Forty-shilling Freeholder, *see* ELECTORATE.

Forum, in Rom. times the central public space of a city, especially the market-place of Rome itself, the *F. magnum*, extending from the foot of the Capitoline to NE. of the Palatine. It was used as a place of assembly for political, judicial, and other public business. Near by was the *F. Julium*, built by Julius Caesar as an annexe to the *F. magnum*; behind it lay the *F. Augusti*. Between these last two and the Temple of Peace was the small *F. Nervæ*. The *F. Trajani* stood between the *F. Augusti* and the Campus Martius. *See* T. Ashley and S. Platner, *Topographical Dictionary of Ancient Rome*, 1929.

Forum Appii (modern Foro Appio), small tn of anct Latium, Italy, on the

Carmagnola as general of his allied forces. After the first war (1426-7) Venice won the provs. of Cremona, Bergamo, and Brescia. The second war (1431-3), after a hard struggle, fixed the Adda as the Venetian boundary. A third war, against Bologna, Milan, and Mantua, broke out about 1435. Supported by Cosimo de' Medici and Francesco Sforza, Venice finally conquered Bellagio, Peschiera, and Lonato. The peace of Lodi (1454) put an end to hostilities. F.'s later life was clouded by the misconduct of his son, which resulted in F.'s deposition in 1457. He d. a week later. Byron's tragedy, *The Two Foscari*, is based on the story of F. and his son.

Foscolo, (Niccolò) Ugo (1778-1827), It. poet and patriot, b. Zante, son of a Gk mother and It. father. From 1796 onward he was an officer in the armies of various attempted It. reps., and served in France (1804-6). In 1808 he was

appointed to the chair of eloquence at Pavia Univ. His tragedies *Teste*, *Iticciarda*, and *Ajace* are essentially political plays; the last-named (performed 1811) was thought to contain hits at Napoleon, and caused him to leave Milan till the decline of Napoleon's power in 1813. When the Austrians regained control of the tn, F.'s patriotic sentiments forced upon him a voluntary exile, first to Switzerland, then to England (c. 1816). His remains were removed from Chiswick cemetery to Florence in 1871. His works include *Le ultime lettere di Jacopo Ortis*, 1797, a novel partly founded on Goethe's *Werther*; *Luigia Pallavicini caduta da cavallo* and *All'amica risanata*, 2 odes, 1799-1803; *Orazione a Bonaparte*, 1802; and *I Sepolcristi*, 1806, his best-known poem, written in blank verse, where he considers tombs in their political and philosophical significance. He also trans. Homer, and Sterne's *Sentimental Journey*. See L. Le Monnier, *Collected Works*, 1850-62, and ed. by Tobler, 1871; C. Gemelli, *Della Vita e dell'opere di U. Foscolo*, 1839; G. Chiarini, *La Vita di U. Foscolo*, 1927; E. Donadoni, *Ugo Foscolo pensatore, critico, poeta*, 1929; G. Citanna, *Le Poesie di U. Foscolo*, 1932; M. Fabrin, *Foscolo Minore*, 1949; E. R. Vincent, *U. Foscolo: an Italian in Regency England*, 1953.

Foss, or **Fosse** (Lat. *fossa*, a ditch, from *fodere*, to dig), in fortification, a long narrow excavation, such as a moat or ditch, dug outside the walls or rampart of a fort to serve as barrier against the advancing foe and prevent an escalade. It is often filled with water or with abatis and palisades.

Foss, **Foss-way**, or **Fosseway**, one of the great military roads constructed by the Romans in England and other parts of Europe, so called from the foss on either side to keep it well drained and dry. This road or series of roads ran from Lincoln via Leicester (Ratae) and Bath to Exeter. It went past Newark and High Cross (Venonae), intersecting Watling Street at a point called the 'centre of England,' then on past Cirencester, Bath, the hills near Chard, Axminster, and Honiton to Exeter. It is mentioned by 11th-cent. writers as one of 4 'royal roads' in Britain.

Fossa (**Fossan**), or **Foussa**, largest carnivorous mammal of Madagascar. A link between cats and civets, it is about twice the size of a house-cat (about 5 ft long), with a long tapering tail and sharp, curved, retractile claws. The naked soles of the hind feet rest entirely upon the ground in walking. The colour is usually a uniform, unspotted, pale brown, and the hair short and close. These animals are of a very savage disposition, and of nocturnal habits. They feed on small animals and birds, sometimes invading poultry yards. They are usually regarded as representing a group within the mongoose family (Herpestidae), under the name *Cryptoprocta ferox*.

Fossa Clodia, see CHIOGGIA.

Fossa et Furea, see PIT AND GALLOWES. **Fossano** (anc. **Fons Sanus**, or **Fossanum**), It tn, in Piedmont (q.v.), 14 m. NW. of Cuneo (q.v.). It has anc. walls, a cathedral, and a 14th-cent. castle. There are mineral baths, and paper and silk manufs., and the tn is an important railway junction. Pop. 21,900.

Fossil. The term (Lat. *fossus*, dug up) was formerly applied to any object taken out of the earth's crust, whether mineral or organic, but it is now applied only to the remains or traces of animals and plants which have been buried in the earth by natural causes. Objects which prove the previous existence of organisms, such as the footprints of animals and the burrows and trails of worms in shales and sandstone are as much F.s as are the remains of the organisms themselves. The majority of F.s are the hard parts of animal or plant organisms, such as the shells of molluscs, the calcareous skeletons of corals, the teeth and bones of vertebrate animals, and the trunks, branches, and leaves of plants, the state of preservation being dependent on the amount of change undergone subsequent to their burial.

For preservation in the F. state the organism must be covered by sediment, or it will disappear by the processes of decay. The remains of terrestrial animals and plants are therefore less likely to become preserved than marine organisms, and the conditions must necessarily be local. Thus, land plants and animals may be found in lakes, peat bogs, marshes, deltas, mineral springs, and 'bone caves.'

It is in the sea that the most favourable conditions for the preservation of organic remains prevail. Sheets of mud and sand are laid down, particularly in shallow water on the continental shelf, and cover the remains of the faunas which flourish there. Elsewhere, organic limestones may be formed containing abundant calcareous F.s. In the deepest parts of the ocean only the remains of planktonic organisms and hard parts such as teeth and ear bones are found in abyssal sediments.

The condition of the preserved remains depends upon the structure and composition of the organisms and also on the manner of fossilisation. The skeletons of most vertebrates consist of calcium phosphate. In the invertebrates the durable parts may be calcium carbonate (calcite or aragonite) as in the molluscs, or may be composed of silica as in the diatoms. Organisms with skeletons of chitin (a complex organic compound) are often preserved intact, while plants and the soft parts of some other organisms are frequently preserved as carbonised films. Sev. methods of preservation may be distinguished: (1) *The original substance is preserved unaltered*. Whole carcasses of Siberian mammoths have been preserved in frozen soil, while entire insects have been preserved in amber. The stony skeletons of shells and corals, and, in a lesser degree, trees and their fructifications, are sometimes wholly preserved.

Naturally, F.s are least changed from their original condition in the newest rock formations and most changed in the oldest. (2) *The original substance is replaced by mineral matter with partial or entire preservation of the structure or the organism.* This is also known as petrification, the organic matter being replaced, molecule for molecule, by mineral matter such as calcite or silica. Minute structures may be preserved in silicified wood, where the cellular details may be seen under the microscope as distinctly as in the section of a modern tree. The aragonite shells of invertebrates such as gastropods and lamellibranchs are dissolved away, and entirely replaced by more durable calcite, forming 'pseudomorphs after aragonite.' (3) *The original substance is wholly removed, the external form being retained.* After the organisms have been buried by sediment, they decay, and merely leave hollow moulds retaining their external form. These moulds may later be filled by mineral matter, which may have been mechanically deposited or chemically precipitated from infiltrating waters, forming casts of the original F. These casts show none of the internal structure of the organism but only the external form.

F.s, as well as being of interest as records of the progress of life on the earth, and lending strong support to the theory of evolution, are of use to the geologist in revealing former geographical conditions. The distribution of land and sea, changes in climate, and the distribution of plants and animals in past times can be elucidated. F.s are also of great importance in geological chronology. It has been possible by the use of the contained F.s to correlate the sequences of stratified formations in different parts of the world and to subdivide geological formations into a series of life zones characterised by 'index fossils.' This has been of great economic value, e.g. in developing coalfields, and in finding and exploiting new oilfields. The F. hist. of many animals and plants is now known in great detail and the evolution of man has also been traced by his fossilised remains. See also PALAEOLOGY; PALAEOBOTANY; PALAEO-ECOLOGY; MICRO-PALAEOLOGY; ANTHROPOLOGY; GEOLOGY.

Fossil Copal, see COPAL.

Fossombrone (anc. *Forum Sempronii*), It. tn, in the Marches (q.v.), on the Metauro, 12 m. SSW. of Pesaro (q.v.). It was severely damaged during the Second World War. There is a cathedral, and there are numerous Rom. remains. Silk is manufactured, and there are mineral springs. Pop. (tn) 4100; (com.) 11,200.

Fossombroni, Vittorio, Count (1754-1844), It. statesman and scientific writer, studied at Pisa Univ., distinguishing himself in mathematics and philosophy. He became minister of foreign affairs to the grand duke of Tuscany (1796), and held offices under the new gov. of Bonaparte (1799). On the restoration of the grand duchy (1814) F. became prime

minister, under Ferdinand III and Leopold II. He put Tuscan finances on a sound footing. He also wrote treatises on hydraulics, mathematics, etc.

Foster, Sir Michael (1836-1907), physiologist, b. Huntingdon and graduated in medicine at London Univ., 1859. He practised for a time in Huntingdon, then returned to London to teach physiology at Univ. College, 1869, and at Trinity College, Cambridge, 1870-83. He became prof. of physiology at Cambridge in 1883 and held that chair until 1903, during which time he became renowned as a teacher; many of his pupils became distinguished scientists. He was the virtual founder of the Cambridge school of physiology. His own work was principally on the physiology of the heart and circulation. F. was biological secretary of the Royal Society, 1881-1903, and president of the Brit. Association, 1899. In 1900 he was Liberal M.P. for London Univ. but was defeated in the election of 1906. He was chairman of the royal commission on tuberculosis and member of that on sewage disposal. His works include *Textbook of Physiology*, 1877, *Elements of Embryology* (with F. M. Balfour), 1874, *Lectures on the History of Physiology*, 1901, a work of permanent value. F. was knighted in 1899. See memoir in the *Journal of Physiology*, vol. 35, 1907.

Foster, (Miles) Birket (1825-99), painter and engraver, b. North Shields, early apprenticed to the wood-engraver Landells. He engraved plates for Gray's *Elegy*, Coleridge's *Ancient Mariner*, Longfellow's *Evangeline*, 1850, *Old English Ballads*, etc. From 1859 F. began painting in water-colours. His landscapes, mainly of Surrey and scenes of rural and child-life, have retained great popularity. Some of the best known are 'Nutting,' 'The Bird's Nest,' 'Sailing the Boat,' 'Cows in the Pool,' 'Feeding the Ducks,' 'Arundel Mill,' 'Castle of Rheinfels.' His illustrated *Christmas with the Poets* appeared in 1850, *Cowper's Task*, 1855, *Britannia*, 1878, and *Some Places of Note in England*. See Scherer, *The Birket Foster Album*, 1880; and H. M. Cundall, *B. Foster*, 1906.

Foster, Stephen (1826-64), Amer. song composer, b. near Pittsburgh, Pennsylvania. He is especially noted for his Negro melodies, which have become very popular in all Eng.-speaking countries, e.g. *The Old Folks at Home*; *Massa's in the Cold*, *Cold Ground*; *Louisiana Belle*; *Come where my Love lies Dreaming*; *Nellie Bly*, etc.

Fothergill, John (1712-80), physician, b. Carr End, Yorks. Educ. at Edinburgh, where he qualified in 1768. He then went to London where he built up a very lucrative practice. F. was a Quaker, noted for philanthropy and professional skill. He helped to found a school for Quaker children at Ackworth and assisted Howard in his efforts at prison reform. His *Account of the Sore Throat Attended with Ulcers*, 1748, was the first authoritative account of diphtheria. He

also pub. important early descriptions of migraine and facial neuralgia, besides many other works. His botanical garden was famous. See *Works* (Lettsom's ed.), 1784; memoirs by J. C. Lettsom, 1783; J. H. Tuke, 1879; R. H. Fox, 1919.

Fotheringhay, par. and vill. of Northants, England, on the R. Nene, 9 m. SW. of Peterborough. A castle was built here in the time of William the Conqueror, but was later enlarged. Here Richard III was b., and Mary Queen of Scots was imprisoned and executed, 1586. The mound and moats still remain. The magnificent 15th-cent. collegiate church is but the nave, aisles, and W. tower of a far larger structure, the choir and aisles of which were destroyed at the Reformation. The tower, surmounted by an octagonal lantern, is remarkable. Pop. 200.

Fotmal, see METEOROLOGY.

Foucauld, Vicomte Charles de (1853-1916), Fr. explorer and hermit, b. Strasbourg, famous in the annals of Fr. exploration in the Sahara. At one time a soldier, he later became a monk. In 1883-4 he travelled through the first and middle ranges of the desert and, disguised as a Jew, made 3 routes over the Great Atlas Mts. Lived as a hermit at Tamanrasset, and was assassinated on the doorstep of his hermitage in 1916. He enjoyed the greatest prestige with the Hoggar Tuaregs, who to-day consider him a saint and martyr. He compiled, amongst other works, a Tamashek dictionary, and made a collection of Tuareg poems and proverbs. His name is spoken, and his life and work are immortalized, in every corner of Algeria. See E. F. Gautier, *Le Sahara, Conquête du Sahara*, 1881-1909, and *Oasis Sahara*, 1905; P. Turnbull, *Sahara Unveiled*, 1940; and P. de Boissieu, *Le Père de Foucauld*, 1945.

Foucault, Jean Bernard Léon (1819-68), Fr. natural philosopher and mechanician, b. Paris, noted for his investigations in optics and mechanics. He perfected the process of Daguerre and Niépce known as the daguerreotype process, and worked with Fizeau and Arago. In 1844 he invented an apparatus for using electric light in optical experiments and microscopic researches. From 1845 he conducted the scientific section of the *Journal des Débats*. F. demonstrated the earth's rotary motion by means of the pendulum, and invented the gyroscope (1851-2). After that his fame was firmly estab. He became physicist to the imperial observatory. 1855, and won the Copley medal of the Royal Society for his researches concerning the velocity of light, showing it to be greater in a vacuum than in air. His scientific treatises form part of the *Bibliothèque d'instruction populaire*. F. became a member of the Academy of Sciences, 1865. See J. Lissajous, *Notice historique sur la vie et les travaux de Léon Foucault*, 1875; C. M. Gariel and J. Bertrand, *Recueil des travaux scientifiques de Léon Foucault*, 1878.

Fouché, Joseph, Duke of Otranto (1759-1820), Fr. politician. b. Le Pellerin,

Nantes, and educ. in Paris by the Oratorians. He took holy orders, and when the Fr. Revolution broke out he was principal of the college of Nantes. F. soon became a prominent revolutionary. In 1792 he represented Loire-Inférieure in the national convention, and sided with the Mountain (q.v.). He helped to crush the risings in La Vendée, and was one of the leaders of the worship of Reason, and an antagonist of Christianity. In 1794 he helped to overthrow Robespierre. F. became minister of police in Paris, 1799, retaining this office under Bonaparte till 1802. He was recalled in 1804, and granted various titles. After 1810 F.'s influence declined, as he was suspected, not without reason, of intriguing with the Bourbons. For a short time F. held office under Louis XVIII, but was forced to resign (1816) and d. in exile. See lives by L. Madelin, 1901, and S. Zweig (Eng. trans.), 1930.

Fouquet, Jean, see FOUQUET.

Fougères, tn in the dept of Ille-et-Vilaine, France, 30 m. N.E. of Rennes. Footwear, cloth, and glass are manufactured. There is a 12th-cent. castle with 13 towers, and the 15th-cent. walls still stand. Pop. 19,300.

Fouillée, Alfred Jules Émile (1838-1912), Fr. philosopher, a member of the academy of moral and political sciences. He greatly influenced modern philosophic thought. His *Mémoires sur la philosophie de Platon*, 1869, and *Mémoires sur la philosophie de Socrate*, 1874, were crowned by the Academy. Other works are *Histoire de la philosophie*, 1875, *La Science sociale contemporaine*, 1880, *Critique des systèmes de morale contemporains*, 1883, *L'Évolutionnisme des idées-forces*, 1890, *Tempérament et caractère*, 1895, *Le Moralisme de Kant et l'amoralisme contemporain*, 1905, *La Morale des idées-forces*, 1907. His wife wrote under the pseudonym 'G. Bruno.' See A. Guyau, *La Philosophie et la sociologie d'A. Fouillée*, 1913.

Fould, Achille (1800-67), Fr. financier and politician, of Jewish parentage. After the revolution of 1848 he was minister of finance, and as such introduced many innovations and improvements. He became senator and minister of state, 1852-60. F. gave the first impulse to the foundation of the Crédit Mobilier. He was reappointed minister of finance by Napoleon III (1861-7), having resigned (1852) on the confiscation of the property of the Orleans family.

Foulis, Andrew (1712-75) and **Robert** (1707-76), 2 noted Glasgow printers who set up their business in 1741. Robert became printer to the univ. in 1743. They followed their profession for over 30 years, issuing eds. of Gk and Lat. classics, poetry, plays, trans., etc. Their 'immaculate' *Horace*, 1744, is famous, but has 6 misprints. Another famous work is the fine folio *Homer*, 1756-8. Their books are distinguished by an absence of ornament and a plainness which often comes near to elegance. In 1753 they founded an academy at Glasgow

for engraving and modelling. The expenses incurred unfortunately proved their ruin. See W. J. Duncan, *Literary History of Glasgow* (Maitland Club), 1831; J. Ferguson, *The Brothers Foulis*, 1889; and D. Murray, *Robert and Andrew Foulis*, 1913.

Foulness, ls. at the mouth of the R. Crouch, in Essex, England, connected with the mainland by road. Pop. 371.

Foundations, in building, the base upon which the structure is built up generally below the level of the ground and whose purpose is to distribute the weight of the building over the soil beneath. In all buildings the weight is concentrated in certain small areas, the bases of walls, columns, etc. The aim of foundation courses is to distribute that weight over as large an area of soil as necessary to avoid subsidence. The possibilities of well-devised F. are illustrated by the construction of the Eiffel Tower, where a weight of 7500 tons is so distributed that each sq. ft sustains only 24 cwt. The design of F. depends upon the weight of the building in comparison with the area of the base, the manner in which the weight is distributed, and the strength and stability of the underlying soil. Land used for building varies from hard, stable rock to loose sand or marshy soil. Between these extremes are gradations of soft rock, firm earth, hard compact clay, dry gravel, and dry close-packed sand. The presence or absence of water, the slope of the strata and the possibility of sliding effects are also important. Before designing F., it may be necessary to make borings in the ground so that the succession and depth of strata may be determined. When the ground consists of hard rock little needs to be done except procuring a level surface upon which to build the walls. On looser soils, load-bearing walls may be carried on concrete strip F.: framed buildings may be carried on separate pad F., one under each column. On very soft or unstable ground, it may be necessary to found the whole building on a continuous reinforced concrete raft. Alternatively, piles (see **PILING**) may be driven vertically into the soil, to carry the load down to firmer strata.

Recently a type of short pile foundation has been developed for small buildings on clay soil. Such a soil shrinks or expands as it dries out or absorbs water at the surface, and this movement may crack walls on shallow footings. To avoid this, holes about 8-10 ft deep are bored with an earth auger and filled with concrete, the piles so formed being joined at the surface by reinforced concrete beams cast in trenches to form F. for the walls. Shrinkage and expansion of the clay, which is usually confined to the top 5 ft, will then have no effect on the building.

Bridges, dams and other special structures raise their own special foundation problems. The basic principles, however, are always the same: either the load has to be transferred to points at or below the surface where no movement will occur.

or the construction has to be such as to accommodate any movement that cannot be avoided. The pontoon bridge provides a striking example of the latter alternative.

See Civil Engineering Code of Practice No. 4 (1954), *Foundations*; British Standard Code of Practice CP101: 1948, *Foundations and substructures of houses, flats and schools of not more than two storeys*; Building Research Station Digest No. 42, *The short-bored pile foundation*.

Foundations, American, non-governmental, non-profit organisations with funds of their own, estab. to conduct or aid activities which serve the welfare of mankind. George Peabody, who set up a fund in 1867 for the advancement of education in the S. states of the U.S.A., was the first to define A. F. in this way. It was not until this century that their numbers began to multiply rapidly, Andrew Carnegie (q.v.) setting the pace. To-day (1957) there are some 5000 F. in the U.S.A. Of the 7 very large ones, Carnegie, Ford, and Rockefeller are best known. The activities and organisations supported by A. F. funds vary. Money is often granted to univ. and similar institutions, and travel grants and scholarships to individuals. Altogether the resources of the A. F. total \$4.5 billion. They provide a good deal of 'risk' capital for educational and public welfare experiments. See W. S. Rich, *The American Foundations*, 7th ed. 1955. See also CARNEGIE TRUST; FORD FOUNDATION; ROCKEFELLER FOUNDATION.

Founder, see HORSE (DISEASES).

Founders' Shares. When a limited liability company is formed, provision is usually made that, after outside shareholders have received a reasonable profit upon their investments, the original owners of the business or founders of the company shall receive the larger share of benefit from any excess profit. In the early days of limited companies this was often contrived by the issue of F. S. to these privileged persons. The plan worked fairly well in many cases, as the special benefits they carried did not become operative until the public subscribers had obtained a satisfactory profit. It was discovered, however, by some rather unscrupulous promoters that, by the insertion of apparently innocent conditions and advantages for these special S. in the articles of association, it would be possible to saddle the outside investor with all the loss, and give him little of the profit. In consequence F. S. fell into disrepute, and the more satisfactory method of issuing preference S. was generally adopted where it was thought desirable to have 2 classes of shareholder. The newer method gives the outside investor the first claim upon profit up to a certain percentage, but when he has received that share, he only benefits in any further profits that may be made in such a way as his arrangement or the prospectus has defined. Preference S. are of so many kinds, and can be issued upon so many conditions, that there is no

object now in issuing S. of which the popular record is unsavoury.

Founding, or Metal Casting, see CASTING; IRON AND STEEL; STEREOTYPING; TYPE AND TYPEFOUNDING; TYPE-CASTING AND TYPE-SETTING MACHINES.

Foundling Hospitals, or Asylums. Originally these were institutions for the rearing and care of children who were deserted by their parents, by means of private charity or at public expense. They were intended mainly to prevent infanticide or wilful procurement of abortion, and the exposure and abandonment of children.

The more enlightened Rom. emperors, Constantine, Valentinian, and Justinian, took measures to abolish such offences. In the 6th cent. the bishop of Trèves ordained that the Church should support all children abandoned and placed in a marble basin by the cathedral porch. The capitularies of the Frankish kings mention similar arrangements. The Council of Nicaea in AD 787 decreed that every city should have an institution for the care of neglected children, resulting in the first true F. hospital (as now understood) at Milan (787), estab. by Dutheus. Between the 11th and 14th cents. many similar institutions followed this in France, Italy, and Germany. In France, especially, the subject received much study and attention. Children were first received in the porch of Notre-Dame at Paris. Marguerite de Valois opened a special home in 1536; but no sum was set aside by the state for the maintenance of the F.s till 1552 when the bishop of Paris founded the Couche, but owing to limited accommodation children could only be taken in by drawing lots.

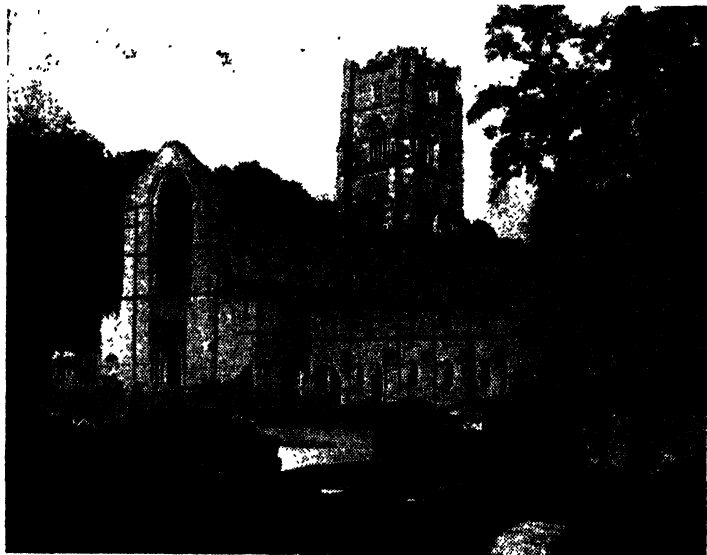
St Vincent de Paul and Colbert, in the 17th cent., tried to remedy the evils that had become prevalent, and the former estab. a home in 1638. Out of it grew the famous Paris F. hospital, incorporated in 1670 under Louis XIV. The Couche was united with it in 1688, and Marguerite de Valois's orphanage in 1772. This hospital takes in all *enfants assistés*, including illegitimate children and *enfants moralement abandonnés* (incorrigibles), as well as real F.s (*enfants trouvés*), almost indiscriminately. The children are generally boarded out in the country after a few days, a sum being paid for their keep, but decreasing yearly and ceasing when the child is 12 years old. The child then usually becomes the apprentice or servant of its foster-parents, but is more or less under gov. supervision till the age of 21. This institution also aims at helping poor parents, and allows the reclaiming of children at any time. Capt. Coram's F. hospital in London was estab. in 1739, but reserved for illegitimate children. Real F.s and waifs and strays are admitted to Dr Barnardo's Homes, Wantage Infant Orphan Asylum, or similar institutions. In the early 19th cent. an arrangement called the 'cradle-tour' (revolving basket or box) was in use for admitting children secretly. This system existed at Marseilles in the 13th cent., but was much abused, and mostly abolished as illegal in

1834. Since 1801 children are admitted to the London F. hospital only after personal examination of the mothers. The previous good character of the mother and her necessity, and the desertion or death of the father, must be known to the committee. Admission is free, and no payment is taken; all children admitted must have had their applications approved before they were 2 months old; some live in the hospital, while others are boarded out. In 1925 the historic site was sold for £1,650,000, and the governors temporarily housed the children in the former Royal Asylum of St Anne's Society, Redhill, Surrey. In 1929 they completed the purchase of the Ashlyns Hall Estate, Berkhamsted, Herts, with 200 ac. of open land at a healthy altitude, for the permanent estab. of the new F. hospital. The London offices are 40 Brunswick Square, W.C.1. The musical traditions inaugurated there by Handel are still kept up. At Moscow and St Petersburg (Leningrad) 2 such institutions were founded by Catherine II (1729-1796). They are to be found also in Italy, Austria, Spain, Scandinavia, China (Canton, 1856), Mexico, Buenos Aires (1774), Rio de Janeiro, and elsewhere. There are many (mostly privately supported) homes in U.S.A., such as the almshouses, Sisters of Charity F. Asylum (1869), Infants' Hospital (1868), Infant Asylum (1871), all at New York. The Dublin Home (1704-1835) was closed owing to the high rate of mortality. The death-rate often ranged from 90 per cent upwards, and averaged 75 per cent. In France and London, especially, this very high figure has now been reduced to about 4 per cent and under. See also CHILD WELFARE AND LABOUR. See R. H. Nichols and F. A. Wray, *History of the Foundling Hospital*, 1935; Women's Group on Public Welfare, *Children without Homes: Proceedings of a Conference*, 1945; and H. Donington, *The Care of Homeless Children*, 1946.

Fountain (Fr. *fontaine*, from late Lat. *fontana*, from Lat. *fons*, spring), term applied to places where there is a continual flow of fresh water, by either artificial or natural means. The earliest example known to exist is at Tello (Lagash) in Babylonia, c. 3000 BC, and next comes the Assyrian F. at Bavian, sculptured in the face of the rock and consisting of a series of basins descending in steps to the stream. Anct Gk F.s of any size were usually enclosed, and were common in the cities, springs being plentiful in Greece. They were dedicated to gods, goddesses, nymphs, deities, etc., and were frequently placed in or near temples. The water-supply of Rome was on a large scale, and the remains of the aqueducts form some of the most striking monuments of Italy. These supplied the baths and the public F.s, which were of a large size and numerous. Public and private F.s were some of the most interesting of the Pompeian discoveries; the private ones were of rich and varied shapes, generally in the form of a niche.

Many of the beautiful 17th-cent. F.s in Rome were designed by the architect Bernini (q.v.). Utility was the first object of a F. in early times, and in tns where a number of people might require to draw water at the same time a large basin was erected with a pillar in the centre, from which pipes, each with a separate jet to supply the running water, radiated all round. Many examples of this kind of F. remain throughout Italy and in the old Ger. tns, and a modern reproduction of the kind is to be seen at Holyrood Palace, Edinburgh. Drinking

appeared soon after 1860; in their earliest form most needed to be charged with ink by means of an independent filler. It was difficult to overcome the problem of producing a pen that was fluent for varying speeds of writing but capable of retaining ink without leakage when not in use; ultimately a feed was evolved which is controlled by the sub-reservoirs beneath the nib. To-day all manufacturers can supply a wide range of nibs, from fine to broad, including writing points specially adapted for italic calligraphy. The modern ball-point pen comes into a rather



FOUNTAINS ABBEY

F.s for wayfarers, as well as horses and other animals, are commonly placed in streets and public resorts, and the Metropolitan Drinking Fountain and Cattle Trough Association was formed in London in 1859.

Fountain Pen, instrument for writing in ink (q.v.) in which the penholder takes the form of a hollow shaft containing a reservoir of ink which is released so as to maintain a steady flow during writing. The pen may be designed to be filled in one of sev. ways: by means of a lever on the barrel of the pen; this releases or depresses a small rubber bag contained within the shaft which draws up or expels the ink by suction; by means of a filler button which acts as a piston; or by means of a snorkel device. Some present-day pens may be loaded with an ink 'cartridge.' The first effective F. P.s

different category; semi-solid ink is used and is carried to the paper by the rolling of the ball.

Fountains Abbey, Cistercian A. of West Riding of Yorks, England, 3 m. from Ripon, founded in 1132, and famous as one of England's most glorious anct monuments. F. A. shows a mellow blending of the Transitional, Early Eng., and Perpendicular styles, and it is not difficult to imagine what it looked like in its heyday. Save for being roofless, the great church, its tower set, curiously, at the end of the N. transept, seems at first sight to be complete, with its long narrow nave, plain and unadorned in conformity with the Cistercian austerity; its chancel enlarged and rebuilt in the 13th cent.; and its beautiful chapel of the Nine Altars or E. transept, which no doubt inspired its only Eng. counterpart at the cathedral of

Durham. The 'great cloisters' vaulted with 2 aisles and 300 ft in length, or more properly the cellarium, is a unique feature of the ruins; there are a refectory and a chapter house, in which latter were interred the remains of 19 abbots.

F. A. has been described as 'the crown and glory of all that monasticism has left us in England.' For 4 centuries it fl. as the greatest Cistercian house in England, and even in its ruined state enables us to recover, better than any other remains of the kind in England, the plan and arrangement of a large Cistercian monastery. F. A., or the A. of the Blessed Virgin Mary at F., originated in a revolt of some monks against the laxity of discipline and worldly tendencies that prevailed at the Benedictine A. of St Mary's, York, and in their determination to withdraw from this A. This they did in 1132, and were provided by Archbishop Thurstan of York with a dwelling-place at F. Very early the monks had applied for admission to the Cistercian order, and this being granted, F. became the spiritual daughter of Clairvaux in Champagne, at that time governed by St Bernard. The little community lived wretchedly for years, but later 3 monks of York (Hugh the dean, and Serlo and Tosti) came to the monastery and bestowed their wealth upon it. Other benefactors followed, and participation in the medieval wool trade brought enormous wealth to the foundation. In 1539 F. A. was surrendered to Henry VIII, who sold the whole estate to Sir Richard Gresham, whose son, the founder of the Royal Exchange, broke up the estate, and sold the A. to Sir Stephen Proctor. The latter used stones from the ruins of the abbot's house to build F. Hall, ruining himself in the process. After many alienations the A. and hall passed in 1768 to the Aislables, ancestors of the earls de Gray and marquesses of Ripon, and for more than 150 years the A. descended from member to member of the family, eventually passing to Commander Vyner, the present owner, 1946. A proposal in that year to restore F. A. as a Benedictine house and an international memorial to all Rom. Catholics killed in the 2 world wars was later abandoned owing to opposition to the sale of the land and buildings. See F. A. Hodges, *Fountains Abbey*, 1904; and C. C. Bell, *The Story of Fountains Abbey*, 1932.

Fouqué, Friedrich Heinrich Karl de la Motte (1777-1843), Ger. writer, novelist, and poet of the Romantic movement, b. Brandenburg. Between 1810 and 1815 F.'s popularity was at its height, and he wrote numerous novels, romances, plays, and epics. The earliest and best known of his works is *Undine*, a classic of romanticism which appeared in 1811. Amongst other vuba. may be mentioned *Der Zauberring*, 1812, and *Die Fahrten Thiodulfs des Isländers*, 1815. See L. Jenthe, *Fouqué als Erzähler*, 1910; J. Haupt, *Elementargeister bei Fouqué, Immermann und Hoffmann*, 1923; and life by E. Reinhard, 1926.

Fouquet, or Foucquet, Jean (c. 1415-

c. 1485), Fr. painter, miniaturist, illuminator, and painter to Louis XI, b. Tours. He travelled to Italy and painted Pope Eugene IV in Rome. His famous portrait of Charles VII dates from 1442. About 1458 he painted the miniatures illustrating *Le Cas des nobles hommes et femmes*, from the Lat. of Boccaccio (later in Royal Library, Munich). Portions of a famous Book of Hours are in the Brentano-Laroche collection at Frankfurt. The Antwerp gallery contains his masterpiece 'Virgin and Child' (tradition says that the Virgin is a portrait of Agnes Sorel). In 1461 F. painted 40 miniatures for Étienne Chevalier, Charles VII's treasurer. A great artist, he united the exquisite manner of the miniaturist with the broader outlook of the dawning Renaissance, and much influenced his contemporaries. See writings of Count Léon de Laborde, Brentano, Count de Bastard; G. Lafenestre, *Jehan Fouquet*, 1905; P. Durrieu, *Jean Fouquet*, 1908; and P. Wechsner, *Jean Fouquet and his Time*, 1948.

Fouquet, or Foucquet, Nicolas, Viscount de Melun et de Vaux, Marquis de Belle-Isle (1615-80), superintendent of finance in France under Louis XIV, b. Paris, the son of a Fr. nobleman in the confidence of Richelieu. In 1650, through the influence of Mazarin, he was given the important position of procureur-général to the parlement of Paris. As superintendent of finance (from 1653) F.'s fortune, largely acquired by fraudulent operations, surpassed even Mazarin's, and the latter's successor, Colbert, who was instructed to inquire into the state of the finances, secretly influenced the king against F. He was finally arrested at Nantes (1661) and charged with malfeasance in office to the king's detriment, and sentenced to imprisonment for life. It has been suggested that F. was the 'man in the iron mask' (q.v.), but the evidence is against this. See P. A. Chéruel, *Mémoires sur la vie publique et privée de Fouquet*, 1862; and J. Lair, *Nicolas Fouquet*, 1890.

Fouquier-Tinville, Antoine Quentin (1746-95), Fr. revolutionary, the public prosecutor of the tribunal during the Reign of Terror, b. Hérouel, Aisne. Here, for a time, he practised law, and then came to Paris, where he turned spy. He was one of the most fanatical on the outbreak of the revolution, and his activity earned him the reputation of one of its most terrible and sinister figures. As public prosecutor, he was utterly ruthless. Danton, St Just, and Robespierre were among his victims, but during the reaction to the Reign of Terror he was himself brought to trial, condemned to death, and guillotined in May 1795. See lives by A. Dunoyer, 1913, and J. W. Barwisich, 1944.

Four Freedoms, peace objectives enunciated by President Franklin Roosevelt at a period in the Second World War when the U.S.A. Gov., while not yet at war, was playing a major part in the 'white' warfare of diplomacy in pursuit of its 2 major aims: defence of the W. hemisphere at a

distance, and support for the free values of the 'W. In his ann. message to Congress of 6 Jan. 1941, President Roosevelt answered the Nazi peace drive in relation, especially, to Hitler's real intentions towards Russia, by repudiating a 'peace dictated by aggressors and sponsored by appeasers,' and set forth his famous 'four freedoms'—freedom of speech, of worship, from economic want, and from aggression. He thus offered a basis for the kind of world worth striving for after the war. But the basis was too generalised, having the disadvantage, in addition, of being unilateral, like Wilson's Fourteen Points (q.v.); and further, the F. F. had been launched in a message to Congress. They therefore bound nobody but their authors. Roosevelt envisaged an agreement with the Brit. on broad political and economic principles while America was still at peace, and, above all, he wished to commit the Brit., grimly fighting for survival, to a post-war programme. Whence the negotiations in Aug. 1941 between President Roosevelt, Sumner Welles (foreign affairs), and Harry Hopkins (q.v.) on the one hand, and Winston Churchill and Sir Alexander Cadogan (permanent under-secretary of state for foreign affairs) on the other, for the Atlantic Charter, which incorporated (*inter alia*) the substance of the F. F. See ATLANTIC CHARTER; ROOSEVELT, FRANKLIN DELANO.

Four Lakes, chain of lakes (Mendota, Monona, Waubesa, and Kegonsa) in Dane co., Wisconsin, U.S.A., connected by the Yahara R., a trib. of the Rock R. Upon an isthmus between the lakes Mendota (the largest, 6 m. long by 4 m. wide) and Monona is Madison, the cap. of the state.

Four-year Plans, German, for economic development, prepared in imitation of the Soviet's 5-year plans (q.v.). The first (1933-6), announced by Hitler, was, ostensibly, a limited plan of road construction and public works, but was soon superseded by a huge rearmament programme, which rapidly absorbed all Germany's unemployed. The next plan (1937-40) covered the development of *Ersatz* (substitute) industries designed to make Germany self-sufficient. This plan, too, was accompanied by continued rearmament, and it was still in progress when war broke out (1939), Germany having failed to attain self-sufficiency in any sphere. Oil production had reached only one-third of Germany's peacetime requirements, iron ore and artificial fibre about 20 to 25 per cent, base metal ores 15 per cent, and fats about 50 per cent.

Fourchambault, Fr. tn in the dept of Nièvre, on the Loire. It has mineral springs, and manufs. nails and wire. Pop. 4900.

Fourcroy, Antoine François, Comte de (1755-1809), Fr. chemist, and the son of a druggist, b. Paris. He was one of the earliest converts to Lavoisier's theories, in conjunction with whom, together with Berthollet and De Morveau, he prepared the *Méthode de nomenclature chimique*,

1787. He organised the École Polytechnique, and instituted schools of medicine. In 1801, under Napoleon, he became director-general of public instruction. The Royal Society's *Catalogue of Scientific Papers* enumerates 59 memoirs by F.

Fourier, François Marie Charles (1772-1837), Fr. social philosopher, b. Besançon. He was educ. at the college in his native tn and then travelled in France, Germany, and Holland. He inherited a considerable sum of money on his father's death, but this he subsequently lost at the siege of Lyons, all his property, in which he had invested his inheritance, being destroyed. He then entered the army, but was discharged on account of ill-health. He afterwards turned his attention to mercantile pursuits, and obtained sufficient by this means to satisfy his wants, and devote his leisure time to the elaboration of his first work on the organisation of society. This is entitled *Théorie des quatre mouvements et des destinées générales*, 1808. It contains his whole system, and was later republished under the title *Théorie de l'unité universelle*, 1841, and *Le Nouveau Monde industriel, ou invention du procédé d'industrie attrayante et combinée distribuée en séries passives*, 1829-30. *Le Nouveau Monde industriel* is probably the most finished exposition of F.'s views, and on its pub. in 1830 he began to attract some attention, adherents gathering round him.

F.'s system was partly one of co-operation, partly of Socialism. His scheme involved a 'phalanstery' (from the word phalanx), consisting of about 400 families, living in common and combining their labour, upon a dist. of about a square league in area. In 1832 an attempt was made to found an industrial colony on this plan, but it was not successful. His complete works were pub. 1841-8. See R. Maublanc, *Charles Fourier*, 1930; F. Armand, *Les Fourieristes et les luttes révolutionnaires*, 1948.

Fourier, Jean Baptiste Joseph (1768-1830), famous Fr. mathematician, b. Auxerre. He was educ. at the military school in his native tn and afterwards taught mathematics in the same institution. In 1795 he became prof. in the École Normale at Paris, which he shortly left for the Polytechnique. In 1798 he accompanied Bonaparte to Egypt, and took a prominent part in the gov. He returned to France in 1801, became prefect of Grenoble, holding that office until the return of Bonaparte from Elba, when he was dismissed. In 1817 he was elected to the Académie des Sciences, and in 1826 was admitted member of the Fr. Academy. On his return from Egypt he contributed to the *Description de l'Égypte*. In 1822 he pub. *La Théorie analytique de la chaleur*, which had formed part of a thesis awarded a prize by the Académie des Sciences in 1812. *Analyse des équations indéterminées* was pub. in 1831, after his death. A collected ed. of his works was pub. in 1889-1890. F. is best remembered for his development of the series which bears his

name, and which has subsequently become of basic importance in the development of the theory of physics, especially wave motion and heat radiation. The general form of the series is that of the representation of the function of a variable between fixed limits by a series of sines or cosines, as

$$a_1 \sin \frac{\pi x}{l} + a_2 \sin \frac{2\pi x}{l} + \dots + a_n \sin \frac{n\pi x}{l} \\ + \dots \text{ and } b_0 + b_1 \cos \frac{\pi x}{l} + b_2 \cos \frac{2\pi x}{l} \\ + \dots + b_m \cos \frac{m\pi x}{l} + \dots,$$

where the limits are 0 and l . The investigation and criticism of the series were continued by such mathematicians as Dirichlet, Riemann, Cantor, Lebesgue.

Fourmies, Fr. tn in the dept of Nord, on the Helpe Mineure, a trib. of the Sambre. There are textile manufas., ironworks, and glassworks which date from 1589. Pop. 12,700.

Fournier, Henri Alban (Alain-Fournier) (1886-1914). Fr. novelist, b. Chapelle d'Angillon, educ. at Brest and later at the Lycée Lykanal, near Paris. He spent 2 years in military service, followed journalism, and in 1913 pub. *Le Grand Meaulnes* (trans. 1948), his only completed novel, and the basis of his reputation. It is a romantic novel, with an underlying suggestion of deeper significance, and the basic idea is symbolist in character. F. d. in action in the First World War. Fragments of his *Colombe Blanchet* were pub., 1922, and *Miracles*, 1924. See T. Rivière, Introduction to *Miracles*, 1924; H. Gillet, *Alain Fournier*, 1948; E. Gibson, *The Quest of Fournier*, 1953.

Fourteen Points, code of allied war aims set forth by President Woodrow Wilson before Congress on 8 Jan. 1918, which for clarity and liberality was in marked contrast to the vagueness and reactionary character of the ideals of the professional diplomatists of 'the balance of power.' The F. P. were instrumental at a critical period in rallying the spirits of many of the oppressed nationalities of central Europe. The P. were (1) open covenants of peace and no secret diplomacy; (2) freedom of navigation in peace and war outside territorial waters, except where seas may be closed by international action; (3) removal of economic barriers; (4) adequate guarantees for reduction of armaments; (5) an absolutely impartial adjustment of all colonial claims, the interests of the peoples concerned having equal weight with the equitable claim of the gov. whose title is to be determined; (6) all Russian ter. to be evacuated and Russia to be given full opportunity for self-development with the aid of the powers; (7) complete evacuation of Belgium and restoration of Belgium without any limit to Belgian sovereignty; (8) all Fr. ter. to be freed, invaded portions to be restored, and the wrong by Prussia in regard to Alsace-Lorraine to be righted; (9) It. frontiers to be adjusted on lines of nationality; (10) peoples of Austria-Hungary to be given an opportunity of

autonomous development; (11) Rumania, Serbia, and Montenegro to be evacuated, Serbia to have access to the sea, and the relations of the Balkan States to be settled on lines of allegiance and nationality under international guarantees; (12) non-Turkish nationalities of the Ottoman empire to be assured of autonomous development and the Dardanelles to be free to all ships; (13) Polish independence to be restored, the independent state to include ters. inhabited by indisputably Polish pops., and to have access to the sea; (14) a general association of nations to be formed under specific covenants to afford mutual guarantees of political independence and territorial integrity to both great and small states. In Oct. 1918 numerous diplomatic notes were exchanged between Germany and the U.S.A., at a time when the Ger. Gov. realised that their military forces were doomed to defeat, in which Germany endeavoured to obtain some modification of this 'charter of allied aims,' but were gradually brought to realise that Wilson would only recommend a cessation of hostilities on condition of unreserved acceptance by Germany of the F. P. The trans. into practical politics of the F. P. imposed difficulties on the most experienced diplomatists and statesmen, and subsequent events were to prove that world society was not yet capable of putting the ideals embodied in them into practice. The F. P. inspired the creation of the League of Nations (q.v.), while the map of Europe was remade in 1919 on lines which appeared to conform as far as practicable to the principle of self-determination. See also COVENANT; EUROPE; PEACE CONFERENCE (1919); VERSAILLES, TREATY OF. See R. S. Baker, *Woodrow Wilson and World Settlement*, 1922.

Fourteenth Army, largest single A. of Second World War. It held the longest battle-line in the war—from the bay of Bengal northwards to where India and Burma border on China. In 1944 and 1945 the F. A. was about 1,000,000 strong (including all its ancillary formations), and just before the fall of Rangoon it had 500,000 fighting men at its disposal. The divs. that served with it were 2nd and 36th Brit.; 3rd Indian (the Chindits), and the 5th, 7th, 17th, 19th, 20th, 23rd, 25th, and 26th Indian; 11th E. African, and the 81st and 82nd W. African. One-third of each Indian div. consisted of Brit. troops, and the African divs. had Brit. officers and N.C.O.s. The A. was grouped into 3 corps: the 4th, 15th, and 33rd Indian Corps. Later the 15th Corps was detached from the F. A. for the 1945 Arakan and Rangoon offensives. Again, a 4th corps—the 34th—was formed for the invasion of Malaya. The F. A. was the A. which broke the myth of Jap. invincibility on land; which denied the enemy the road to India, and finally threw him back in 2 great thrusts—from Kohima to Mandalay and from Mandalay to Rangoon. Its victory was not only over the Japanese, but over the terrain,

the jungle, and the climate. It was the first A. to plan and execute the movement of whole infantry divs. by air. It was the only A. in the war to develop air supply to the extent of maintaining its front-line troops entirely by air; and from the time of crossing the Chindwin to the fall of Rangoon the whole campaign was based on air supply, which reached a rate of 3000 tons a day. Lt.-Gen. (later Gen., and F.M.) Sir Wm Slim commanded the F. A. from its formation until just before the Jap. surrender. See Sir W. Slim, *Defeat into Victory*, 1956. See also BURMA, SECOND WORLD WAR CAMPAIGNS IN.

Fourth Estate. Edmund Burke, in alluding to the 3 E.s of the realm, viz. lords, clergy, and commons, constituting the Brit. Parliament, termed the public press the F. E., by reason of the enormous influence journalism exerts over both imperial and domestic affairs.

Fourth Party, name applied to a small opposition group within the Eng. Conservative P. about 1880, under the leadership of Lord Randolph Churchill in the House of Commons. The F. P. made itself conspicuous in 1880 and the succeeding years by its vigorous attacks upon the recognised leaders of both P.s. See W. Churchill, *Life of Lord Randolph Churchill*, 1906; and H. E. Gorst, *The Fourth Party*, 1905.

Fourth Republic, of France, came into official existence 24 Dec. 1946. After the liberation of France from the Germans in 1944, the country was governed as a rep. under a provisional gov. headed by de Gaulle (q.v.). The 2nd Constituent National Assembly approved the constitution of the F. R., 29 Sept. 1946; it was then approved by a national referendum (by a majority of under a million, with over 8,500,000 abstentions), 13 Oct. 1946, and came into force 2 months later. The constitutional law of 7 Dec. 1954 made some modifications to the constitution. See further under FRANCE, History.

Foussel Oil, see FUSEL.

Foussa, see FOSSA.

Fouta Djallon, see FUTA-DJALON.

Fowey, port and tn of Cornwall, England, situated on the R. F., 28 m. SW. of Devonport, and 280 m. from London. In early times it was an important seaport, and ships for the crusades were fitted out here. In the reign of Edward III the tn equipped a fleet of 47 vessels, and about 800 men, for the siege of Calais. The inhab. were in later times convicted of piracy, and were deprived of their vessels. Queen Victoria and the prince consort visited the tn in 1846. The prin. industry is the export of china clay, and there is a deep and sheltered harbour. There is a coast-guard and lifeboat station. 'Q.' Sir Arthur Quiller-Couch (q.v.), settled here in 1891, and described F. in his *Troy Town*. Pop. 2300. See W. Macarthur, *The River Fowey*, 1948.

Fowl, see POULTRY.

Fowler, Henry Watson (1858-1933), lexicographer and linguist, son of the Rev. Robert F. of Tonbridge. Educ. at

Rugby school and Balliol College, Oxford. Assistant master at Sedbergh School, 1882-89. In 1905 he produced, in collaboration with his brother F. G. F., a trans. of Lucian, which was pub. by the Oxford Univ. Press. The following year the brothers brought out *The King's English*, which was most successful. They were then commissioned by the Oxford Univ. Press to prepare an abridgment of the *Oxford Dictionary*, which was pub. in 1911 as *The Concise Oxford Dictionary*. Both brothers served with the B.E.F. in the First World War. F. G. F. losing his life. F. then finished alone the *Pocket Oxford Dictionary*, which they had begun in collaboration. The work by which F. will, perhaps, be chiefly remembered is his *Dictionary of Modern English Usage*, 1926—highly original in treatment, and valuable as an aid to correct expression in Eng. This was followed in 1929 by the 2nd ed. of *The Concise Oxford Dictionary*, embodying changes in the language since 1911—the purpose of the work from the first being to 'present as vivid a picture as the small dictionary could be made to give of the English that was being spoken and written at the time.' He also prepared much of the 3rd ed., 1934, which was pub. with a supplement by H. G. Le Mesurier shortly after his death. His various linguistic speculations appeared in the pubs. of the Society for Pure English. Other pubs.: *If Wishes were Horses*, 1929, and *Some Comparative Values*, 1928.

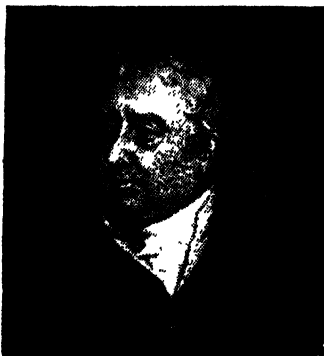
Fowler, John (1826-64), inventor, b. Melksham in Wilts. He is chiefly famous for his steam plough, in which the plough is moved by traction of a stationary engine. This was first employed with satisfactory results in 1850 in the drainage of Hainault Forest in Essex. F. was also the inventor of other improved agric. machines.

Fowler, Thomas (1832-1904), philosopher, b. Lincs. He received his education at King William's College, Isle of Man, and at Merton College, Oxford, where he graduated in 1854. In 1881 he was elected president of Corpus Christi College, which position he filled till his death; and from 1873 to 1888 he was prof. of logic at Oxford. From 1899 to 1901 he was vice-chancellor of the univ. His pubs. include *The Elements of Deductive Logic*, 1867; *The Elements of Inductive Logic*, 1870, *Bacon's Novum Organum*, ed. 1878, *Locke* (in Eng. Men of Letters), 1880, *Francis Bacon*, 1881, *Progressive Morality: an Essay in Ethics*, 1884, *History of Corpus Christi College*, 1898.

Fowling, hunting and catching of birds and wild fowl generally, viz. swans, geese, and the different varieties of duck—canvas-backs, redheads, mallard, teal, pintail, and wood duck, etc. F. is performed in a variety of ways, such as by concealment of the hunter, by decoy, or occasionally, in some parts, by the training of dogs and of ponies to attract the birds. See also WILD FOWL.

Fox, Charles James (1749-1806), Eng. statesman, 3rd son of Henry F., 1st Baron

Holland, educ. at Eton and Hertford College, Oxford. As a boy, encouraged by his father, who desired to make a man of him, to ape the vices of those older than himself, he became a heavy drinker and a reckless gambler. F. entered parliament when he was in his twenty-first year, and in 1770 Lord North made him a lord of the Admiralty, which office he held only until 1772, when he resigned in order to be at liberty to oppose the Royal Marriage Act. He proved himself so excellent a debater that North persuaded him to rejoin the ministry at the end of the year as a lord of the Treasury, but his independence was so marked that the king insisted upon his dismissal. In opposition he vigorously attacked the ministerial policy which cost England her Amer. colonies.



CHARLES JAMES FOX

In 1782 he became secretary of state under Rockingham, but on the death of his chief refused to serve under Shelburne. In the following year he formed a coalition with North, becoming joint secretary of state with him under the duke of Portland, but was dismissed in Dec. when, by the king's intervention, his India Bill was thrown out. The king, who disapproved of F.'s opinions and resented his friendship with and influence over the prince of Wales, was determined never again to let him take office, and he managed to exclude him from the Coalition ministry of 1804, but 2 years later, when Grenville became prime minister, had to accept him as secretary of state. Thus, in the ministry of all the talents, F., who had been in opposition for more than 23 years, d. in office. F. had little ability as a constructive statesman, but he was a brilliant leader of opposition. His readiness in reply, his power of speaking at any time and on any subject, made him invaluable to his party, although his words and actions were often inconsistent, and he cheapened his arguments by carrying personal grudges into his public life. His

personal popularity kept his party together, though his attitude to the Fr. Revolution eventually caused a political and personal breach between him and Burke (q.v.). F. was an ardent Whig, opposing all abuses and restrictions of the liberty of the subject. Only shortly before his death he brought in a measure to abolish the slave trade. F. was one of the 2 men of his century who may be described as founders of Brit. parl. Radicalism—the other being Burke. In the hour of their separation F. described in broken sentences the debt he owed to Burke's inspiration. Burke had found the Whigs a world of selfish nobles who cared only for the spoils of office, and begun to create a new Whig party with principles and ideals, and F. soon fell under his spell. He became Burke's chief ally in the battle for justice to the Amer. colonies, justice to Ireland, justice to India, and for the estab. of effective parl. gov. As the advocate of Burke's large ideas F. rapidly made himself the leading popular politician in England. But the great fund of prestige and popularity that he won during his struggle against the king and Lord North during the Amer. war he threw away by a series of sensational blunders. Few would say that F. was well advised in his unquestioning support of the Fr. Revolution, or in his opposition to Pitt during the Fr. wars. But whatever view is taken of his actions, or of the inevitability of the Fr. wars, few can doubt the value of his resistance to the campaign of domestic repression that set in when the war began and lasted for more than 20 years; and in this way F.'s conduct during the Napoleonic wars probably ultimately served the cause of national unity. See Lord John Russell, *Life and Times of Charles James Fox*, 1859-66; Sir G. O. Trevelyan, *Early History of Charles James Fox*, 1889; J. L. Hammond, *Charles James Fox, a Political Study*, 1903; J. Drinkwater, *C. J. Fox*, 1928; and C. Hobhouse, *Fox*, 1934, 1948 (with an essay by H. Nicolson).

Fox, George (1624-91), founder of the religious Society of Friends (q.v.) or Quakers, b. Fenny Drayton, Leicestershire, the son of a weaver, (Christopher F.; was apprenticed to a shoemaker who also dealt in cattle and wool. Not satisfied with conventional piety, at 19 he left home and wandered for 4 years attending meetings and seeking help from religious people of all kinds. At last, when all his hopes in men were gone, he heard a voice which told him there was one Christ Jesus who could answer to his need. His assurance of this inward presence grew, and soon he began to speak of Christ as the inward teacher of all men who would heed, independently of institutions, priests, rites, or forms of creed. From about 1647 he preached at fairs, in churches after the regular preacher had done, and quickly found followers. His rejection of all mediated religion earned the hostility of ministers, to some of whom he seemed a blasphemer. In Commonwealth times he suffered 4 imprisonments

either for heresy, blasphemy, or as a disturber of the peace. By 1654 Fox and his first converts had created a nationwide movement, but often suffered violent ill usage from crowds. After the Restoration, F. and his followers, who now numbered many thousands, were uncompromising dissenters from the Anglican Church, refusing also to pay tithes. They would not take any oath, even in court, having a single standard of truth. Nor would they, in sincerity, use titles or gestures of social flattery, but addressed all men with the *thee* and *thou* of the common people, and doffed the hat only in prayer. This social radicalism made them suspect as a subversive influence, or as plotters, though in daily life their conduct strove to appeal to the best, the Light of Christ, in all men, and they shunned resort to arms because it was inconsistent with their attitude to men. The systematic persecution of dissenters fell especially heavily on the Quakers, and soon over 4000 of them were in prison. In 1664, F., on the evidence only that he refused the oath of allegiance, entered his 7th and harshest imprisonment, 3 years in Lancaster and Scarborough castles. When released he began 3 years of continuous travel over England, Wales, and Ireland, in spite of disabilities resulting from imprisonment. In that time he instituted a system of church gov. which developed the Quaker movement into a society. In 1671-3 he travelled through the West Indies and the Amer. colonies, where were many Quakers. In 1673-5 he suffered his last imprisonment, at Worcester. He paid visits to Holland and Germany in 1677 and also in 1684. The last years of his life were spent in and about London in the interests of the society he had founded. His friend Wm Penn testified of him that 'his authority was inward and not outward and he got it and kept it by the love of God and the power of an endless life . . . I never saw him out of his place, or not a match for every service or occasion.' His *Journal* was pub. 1694, and many times reprinted. The list of F.'s writings, mainly pamphlets, occupies over fifty pages in Joseph Smith's *Descriptive Catalogue of Friends' Books*, 1867.

EDITIONS.—*Journal*, 1911, and *Short and Itinerary Journals*, 1925, give various MSS. re-ed. verbatim by N. Penney. *Journal* (abridged), Everyman's Library, last reprinted 1948; *Journal*, definitive text, ed. J. L. Nickalls, 1952. See J. S. Rowntree, *Life and Character of George Fox*, 1894, *New Appreciations of George Fox* (foreword by J. Rendel Harris), 1925; Baron F. von Hügel, *Essays and Addresses*, 2nd series, 1926 (essay entitled 'On the place and function within Religion of the Body, of History, and of Institutions'); and Vernon Noble, *The Man in Leather Breeches*, 1953.

Fox, Henry, see HOLLAND, 1st BARON.
Fox, Henry Richard Vassall, see HOLLAND, 3rd BARON.

Fox, John (1862-1919), Amer. novelist, b. Paris, Kentucky. Educ. at Transyl-

vania Univ. and Harvard, he was a special correspondent in the Sp.-Amer. and Russo-Jap. Wars, and in 1887 was in the mining business in Virginia. His novels, which were very popular, were largely idealised pictures based on his mining experiences. They include *The Little Shepherd of Kingdom Come*, 1903, *The Trail of the Lonesome Pine*, 1908, which sold well over a million copies, *The Heart of the Hills*, 1913, and *Erskine Dale*, *Pioneer*, 1920.

Fox, or Foxe, Richard (c. 1448-1528), bishop and statesman, b. Ropesley; probably educ. at Oxford. He was a trusted adviser of Henry VII, and held the posts of secretary of state, privy seal, bishop of Exeter (1487), of Bath and Wells (1492-4), of Durham (1494-1501), and of Winchester (1501-28), besides performing many diplomatic missions. He negotiated the marriages of Margaret Tudor and James of Scotland, and of Prince Arthur and Catherine of Aragon. After the accession of Henry VIII, however, his cautious policies were out of favour, and in 1516 he retired from court. He founded Corpus Christi College, Oxford in 1516.

Fox, 2 rivs. of the U.S.A. One, 176 m. long, rises in the lake area to the N. of Madison, Wisconsin, is connected by the Portage Canal with the Wisconsin R., and continues NE. to Lake Winnebago at Oshkosh and beyond this to Green Bay. The other, 185 m. long, rises near Waukegan, Wisconsin, and flows SSW. to the Illinois R. at Ottawa, Illinois.

Fox (Dutch *vos*; Ger. *fuchs*), name properly applicable only to the Brit.



Mirrorpic

representative of the family Canidae, but now used to include many other species. The feminine form, 'vixen', represents the O.E. *fuſen* (fox plus the feminine termination -en). The genus *F.* (*Vulpes*) is distinct from the genus *Canis* by the slighter build, the long and bushy tail, and

the large ears of the members of the former. Also the projection behind the eye-socket has its upper surface concave, with a raised ridge, instead of regularly convex as in the genus *Canis*, and there is not a hollow chamber within the frontal bone of the forehead. The range of the F. extends eastwards across Europe to Japan, and to the S. across North Africa, Persia, NW. India, and the N. Amer. side of the Atlantic. Naturally over such an area many local differences are found, and the red F. of NW. Europe differs considerably from the white-footed F. of Persia and Arabia, whilst both are in many respects dissimilar to the black F. of N. America. Among other species may be mentioned the Himalayan F. (*Vulpes montanus*), the Tibetan F. (*V. ferrilatus*), the Alaskan F. (*V. harrimani*), the largest species, the Indian F. (*V. bengalensis*), the *V. famelicus* or *aegyptiacus* of Egypt, the Arctic F. (*Alopex lagopus*), etc. The Amer. grey F. (*Urocyon cinereo-argentatus*) is a separate sub-genus of *Canis*, whilst the long-eared F. of South and East Africa (*Otocyon megalotis*) forms a distinct genus. The skins of many varieties of the F. are valuable, and are largely imported into this country for furs. The cunning of the Eng. F. is well known. The vixen brings forth a litter of from 5 to 8 cubs in April, the period of gestation being 60 to 65 days. The cubs take 18 months to grow to their full size and strength; the average life of the F. is about 13 years.

Fox-bat, see FRUIT BAT.

Fox-hunting, as practised at the present time, is not of very great antiquity. Foxes existed in this country from early times, and they were hunted in the days of Edward I., but such hunting was as different from F. proper as light from dark. Wm. the Twin, who was head huntsman to Edward II., mentions the fox as belonging to the inferior class of animals that should be exterminated by any means, and again in the *Records of the Chase*, written in the time of Edward III., the fox is named with contumely. In those times foxes were pursued with no ceremony or methods, but caught in nets, or shot, or dug up from their earths and slaughtered at every possible opportunity. Such views prevailed until the 18th cent., when F. began to take its place as a sport. It is not possible to say with exactitude when the first pack of hounds was maintained in England entirely for F., but the following facts throw some light on the matter. In a letter from one of his descendants, it is stated that Lord Arundale, between 1690 and 1700, kept a pack of fox-hounds which were maintained in the family until they became the property of Hugh Maynell in 1782. The *Field* of 6 Nov. 1875 describes a horn, which later became the property of Thomas d'Avenante, Esq. The inscription on this reads: 'Thomas Boothby, Esq., Tooley Park, Leicester. With this horn he hunted the first pack of foxhounds then in England for fifty-five years. Born 1877. Died 1752.' These statements are not

conclusive, as the packs mentioned may not have hunted foxes exclusively, but they serve to indicate the probable truth of the statement in Lord Wilton's *Sports and Pastimes of England*, 1868, that hounds began to be entered solely to fox about 1750. In the early days of F. the procedure was somewhat different from the present. The meet took place in the early hrs of the morning, and the fox was traced by his 'drag,' that is, the line he had taken on his return from a foraging expedition on the previous night. The disadvantage of such a course was that a fox was very liable to be scared by the hounds on the drag scent, and make good his escape before they caught the real scent.

Now, owing to the decrease in woods, etc., it is considered the better way to find the fox in his kennel, and the hr of the meet is retarded until about 11 in the forenoon. When the fox breaks away from the covert he is allowed to travel for some little distance before the alarm is given, in order that he may not retrace his steps into the covert. The rules which govern scent are as little understood to-day as ever. On some days when all things seem propitious the scent will fail, and vice versa. It is thought by some that the manner in which hounds come out of covert may be taken as an indication; if they dwell for some moments before settling to the line the scent is good, but if the scent be poor they will make all haste not to lose it. An easterly wind is probably the best for scent, in spite of the poet who sings of 'a southerly wind and a cloudy sky.' An extraordinary circumstance is that if the fox is coursed at any period of the run by a dog, the scent falls after that point. The most dreaded foe of the fox-hunter is of course frost. The hunting season proper begins in Nov.; but during part of Sept., the actual date of starting varying according to the time of harvest in different parts of the country, and during the whole of Oct. cub-hunting is carried on. The object of this is indicated by the name, to blood young hounds, teach them their business, and scatter the cubs. Cub-hunting is commenced in the early morning, about 7 a.m. The size of packs naturally varies from very large establs. in the Shires to small kennels in the N. of England. If a pack hunts for 5 days in the week, or possibly 6, as some do, about 75 or more couples of hounds will be required; if 4 days are hunted, from 50 to 60 couples; or if only 2 days, from 25 to 30 couples. A new entry begins cub-hunting at the age of about 18 months, and is then probably of the first class for 3 or 4 more seasons. Many hounds last longer than this, and it is recorded of 'Potentate,' a noted hound belonging to a duke of Beaufort, that he hunted for 11 seasons. The pick of the hunting in Great Britain is supposed to be in the Shires, a somewhat arbitrary term, which conventionally means Leicestershire, Northants, and Rutlandshire, but does not exactly correspond with these. The packs which hunt the

Shires are the Belvoir, the Cottesmore, the Quorn, and the Pytchley.

Despite various agitations and remonstrances, the sport of F. has not declined in popularity of recent years; but the active work of the National Society for the Abolition of Cruel Sports (101 Chandos House, Westminster, S.W.1) and the League against Cruel Sports (58 Mudox Street, Bond Street, W.) has forced the F. fraternity into forming a society called the Brit. Field Sports Protection Society. A Bill for the banning of blood sports, including F., was introduced by a private member in 1949, but met with no great support in the Commons so far as F. was concerned.

In 1955-6 there were 236 packs of hounds in the Brit. Isles—194 in England and Wales, 32 in Ireland, and 10 in Scotland. As regards the cost of hunting, it may be taken as a rough estimate that for every day in the week that hounds hunt the cost per annum will be between £1250 and £1750; various local circumstances will influence the cost in each case, but it will not as a rule fall below £1000. Any price may be given for hunters, from £30 to £800; sev. hundreds of horses, ranging in price from 200 guineas to 650 or 700 guineas, passing annually through the hands of Tattersall's in London and Warner Sheppard and Wade's in Leicester. If a man wishes to hunt regularly with a pack in the Shires, he must, of course, have a far greater estab. than a man who hunts in the N. The sums of money that are spent on hunting every year in this country in normal times are very large, and many persons are employed in connection with the sport. The officials of a hunt comprise the master (M.F.H.), 1 or 2 'whippers-in,' and a kennel huntsman or 'feeder.' If the huntsman is an amateur, he is also invariably the master; if the master does not hunt his own hounds a paid huntsman is employed. In large packs 2 whippers-in are employed, but in some packs only 1. The duties of whipper-in and kennel huntsman are often performed by one person, especially if the master hunts his own hounds. The kennel huntsman proper is the man who looks after the hounds in kennel, feeding them and attending to them, and who also walks them out. It was, however, the opinion of Lord Willoughby de Broke, one of the foremost authorities, that the man who hunts the hounds should also feed them. It is the first duty of a huntsman to gain the confidence of his hounds; the sagacity and resource of a well-trained pack are remarkable. The whipper-in, or whippers-in, when the hounds are drawing a covert, should be neither too near to nor too far away from the hounds; when they have found, he should get to them as soon as possible, and take a line parallel to that of the huntsman, and prevent the pack from dividing. The quality of the hunting enjoyed at the present day is probably as good as ever it was. Great care is exercised in the breeding of hounds and of horses, and the pace is set, on the whole, faster of late years.

F. is by no means confined to England at the present time, but has been transported to various quarters of the globe. Manitoba has had a pack since 1826, and the Peshawar Vale hounds in India are as celebrated as the Belvoir or Quorn in England. The enthusiasm of the garrisons at Alexandria and Cyprus caused hunting to be instituted there, and among other places where the sport is carried on may be mentioned Florida, where meets are held in moonlight, other parts of the U.S.A., Bechuanaland, and New Zealand. There are 96 packs of hounds hunted in the U.S.A.

See Peter Beckford, *Thoughts on Hunting*, 1820; 'Cecil,' *Records of the Chase*, 1854; Lord Willoughby de Broke, *Hunting the Fox*, 1920; S. Reeve, *Fox-hunting Recollections*, 1928; A. H. Higginson and J. A. Chamberlain, *Hunting in the United States and Canada*, 1928; L. D. R. Edwards, *Huntsmen Past and Present*, 1929; S. Sassoon, *Memoirs of a Fox-hunting Man*, 1929; A. H. Higginson, *Two Centuries of Fox Hunting*, 1946; Frances Pitt, *Hounds, Horses and Hunting*, 1948; G. T. Burrows, *Gentleman Charles*, 1951; and *Baily's Hunting Directory* (pub. annually).

Fox Indians, North Amer. Indian tribe of the Algonquian linguistic family and closely allied to the Sauk (q.v.). They were defeated by the Fr. and to-day number about 500, mostly in Wisconsin.

Fox-shark, or **Thresher**, name given to *Alopias vulpes*, a common species of sharks found in the Mediterranean and the Atlantic and in most subtropical and temperate seas. Its chief characteristic is a very long tail, nearly half of its own length, which is from 15 to 20 ft. The F. follows the shoals of small fish, such as herrings or pilchards, driving them together by the lashing of its tail. Hence its name.

Fox-terrier, small dog which used formerly to run with the hounds; it is probable that the modern F. has developed from these small hunting dogs. They were used to unearth foxes from holes, but since the speed of hounds has increased it has been found impossible for them to keep up with the chase. Smooth-haired terriers were first exhibited about the middle of the 19th cent., and have become very popular as house dogs. The rough-haired variety were exhibited in 1872. F.s make intelligent and affectionate companions. Though not snappy and quarrelsome, they are always ready for a fight, and make excellent ratters. The chief points are: Head long, flat, and narrow, with very strong teeth, small ears, small keen eyes, black nose, and clean cheeks; shoulders sloping; forelegs very straight and bony, with firm, compact feet and arched toes; chest and fore-ribs narrow; hocks strong; stifles well bent; tail, which is usually cut short in puppyhood, is held erect; colour, white with black or tan markings, brindle spots being objectionable. The smooth-haired variety should have a thick, dense, and smooth coat; the rough-haired, coarse,

of a bent and splintered bone: this is an incomplete F., as are also depressed and fissured F.s. Multiple is when more than one F. is present. F. is rendered more likely by any morbid condition which weakens the bone, by the condition of old age, when bone becomes more brittle. F. may be recognised by the helpless condition of the limb, the extreme pain on movement of the affected part, and, frequently, a visible deformity. When the signs are present further investigation must be carried on with the minimum of movement. An unmistakable symptom is *crepitus*, by which is meant the grating sensation of the broken pieces passing over each other; this symptom should never be looked for except by a doctor. The treatment aims at aligning the broken ends accurately together to restore the normal anatomy of the bone, and the part is secured by splints or other apparatus to secure immobility. Sometimes fixation of the broken fragments is secured by surgical operation and plating, pinning or screwing them together. When the bone has joined, gradually increasing movement is advocated in order to accustom the muscles, tendons, etc., to the resumption of their functions.

For F.s in horses, see under HORSES (DISEASES).

Fragaria, or **Frangaria**, see STRAWBERRY.
Fragmental Volcanic Rocks, see PETROLOGY; AGGLOMERATE; TUFF.

Fragonard, Jean Honoré (1732-1806), Fr. painter, b. Grasse, Provence; studied under (Chardin and Boucher (qq.v.), and in 1752 won the Prix de Rome. He then went to Italy, and was much influenced by the work of the Venetian painter Tiepolo. He illustrated St Non's *Voyage de Naples et de Sicile*. In 1765 he returned to France, and executed 'Callirrhoe', commissioned by Louis XV for reproduction in tapestry. After the Revolution he d., almost forgotten, in Paris. He produced sev. decorative paintings and many landscapes, and also worked in pastel and water-colour and engraved. Among his best works are genre paintings of contemporary life. A masterpiece of charm is 'The Swing', 1767 (Wallace collection). Many pictures are in the Louvre, including 'Bacchante Asleep', 'Nymphs at the Bath', 'Music Lesson', 'The Guitar Player', 'Cupid and a Girl', 'The Happy Mother', and 'The Cradle.' See G. Grappe, *La vie et l'oeuvre de J.-H. Fragonard*, 1929; E. and J. de Goncourt, *French 18th century painters*, (trans. 1943).

'Fram' (Norwegian, 'forward'), ship especially designed for Arctic exploration by Dr Fridtjof Nansen, and used by him in 1893. The strength of the ship, combined with the sloping sides, successfully withstood the pressure of the ice. She was used again by Sverdrup during the second Norwegian North Polar Expedition, 1898-1902, and by Amundsen during the Norwegian Antarctic Expedition, 1910-12. F. is now laid up in a special museum near Oslo. A model exists in the Scott Polar Research Institute (Cambridge).

Framboesia, see YAWS.

Frameries, tn in the prov. of Hainaut, Belgium, 4 m. SW. of Mons. There are important coal-mines here, and also a chalk quarry. It has manufs. of chicory and ropes, breweries, distilleries, brick-works, and limekilns. Pop. 12,300.

Framingham, tn of Middx co., Massachusetts, U.S.A., on Sudbury R., 19 m. WSW. of Boston. It includes S. F. and Saxonville. Automobile manufacturing and assembling, and the manuf. of paper, rubber, and metal products, also shoes and carpets, are carried on. There is truck, dairy, and poultry farming. It was settled in 1650 and incorporated as F. in 1700. A state teachers' college is situated here. Pop. 28,100.

Framlingham, tn of Suffolk, England, 22 m. NE. of Ipswich. The tn is built round a spacious market-place, and contains a fine flint-work church (in which are tombs of sev. notable members of the Howard family), and the Albert College, 1864. The 14-cent. castle, largely destroyed in 1650, was the refuge of Queen Mary after Edward VI's death. Pop. 2100.

Frampton, Sir George James (1860-1928), sculptor. He studied under W. S. Frith, entered the Royal Academy schools in 1881, gained the gold medal and travelling studentship in 1887, and studied in Paris under Mercie and Dagnan-Bouveret. In 1894 he exhibited at the Royal Academy and was elected an associate. In 1900 he gained the *medaille d'honneur* at the Paris Exposition. He was elected R.A. in 1908, and knighted in the same year, and during 1911-12 was president of the Royal Society of Brit. Sculptors. Among his works are 'Peter Pan' in Kensington Gardens, the Edith Cavell memorial in Westminster, 'Lamia', the Mitchell memorial at Newcastle, the Keene memorial, statues of Queen Victoria at Calcutta, Winnipeg, etc., and the sculpture on many famous buildings, such as the Constitutional Club and the Glasgow Art Galleries, and the figures on St Mary's spire, Oxford.

Frano, unit of money in France and other countries. The name dates back to the 14th cent., when, in 1360, a gold coin was struck bearing the effigy of King John II on horseback, and the legend *Johannes Dei gracia Francorum rex*. This particular coin went out of use in the latter half of the 15th cent., but the name continued to be used for the livre (tournois) (q.v.), and a sum of money was referred to indistinctly as, e.g., 'trois francs' or 'trois livres.' From 1578 onwards silver F.s were struck. These pieces were worth about 2fr. 60c. of Fr. money at pre-1914 value. After the Fr. Revolution, the F. assumed the value (about 25 to the £ sterling) which it bore with slight variations until 1914. The F. is divided into 100 centimes, and in its present form as the official Fr. monetary unit, and as a unit of the decimal system, dates from 1795. In 1865 an agreement was signed by which sev. European countries bound themselves in the Lat.

Monetary Union to adopt the decimal system of the Fr. F. In Switzerland the unit is called the F., in Italy the lira, and in Greece the drachma. Like the moneys of the other European belligerents, the Fr. F. fell seriously in value during the First World War, eventually dropping to one-fifth of its value as against gold. Through the energetic measures of Raymond Poincaré the value of the F. was stabilised at 124·21 to the £ in June 1928. On the liberation of Fr. in 1944, the F. was fixed at 200 to the £, but by 1948 had been devalued to as low as 1060 to the £. Since Sept. 1949 the value has been pegged at 980 fr. to the £ sterling, and 350 fr. to the \$ U.S.A. Coins in circulation are 50 and 20 F.s in copper-aluminium, 10 F.s in copper-nickel and in copper-aluminium, and 5 F.s, 2 F.s, and 1 F. in aluminium. See METROLOGY.

Francavilla di Sicilia, tn in Sicily (q.v.), 30 m. SW. of Messina (q.v.). Pop. 6000.

Francavilla Fontana, It. tn in Apulia (q.v.), 19 m. SW. of Brindisi (q.v.). It has a cathedral and a royal palace. Textiles and leather are manufactured. Pop. 26,900.

France, Anatole (Jacques Anatole Thibault) (1844-1924), Fr. writer, b. Paris. His father kept a bookshop and specialised in rare vols. and MSS. He was sent to the Jesuit Collège Stanislas, where he became strongly attracted to the anc. classics—especially Homer; and he learned medieval hist. at the École des Chartes. When he was 15 he dedicated to his parents his first literary work, *La Légende de Sainte Radegonde*, 1859. He contributed verse and articles to the smaller reviews; it was in the *Revue théâtrale* that he first signed himself A. F. For Pierre Larousse's *Grand dictionnaire* he wrote articles on masterpieces of antique art. His first pub. vol. was *Étude sur Alfred de Vigny*, 1868. Later appeared some vols. of his verse. In 1876 he became an assistant in the library of the Senate under Leconte de Lisle. In 1879 he pub. in 1 vol. 2 little novels, *Jocaste* and *Le Chat maigre*, which show the influence of Daudet and Dickens. His originality was manifested in *Le Crime de Sylvestre Bonnard*, 1881, 'a model of prose, harmonious and winged.' *Les Désirs de Jean Servien*, a sad tale of the Commune, came out in 1882. *Le Livre de mon ami*, 1885, is a delightful assortment of childish recollections.

On 21 Mar. 1886 he joined the staff of *Le Temps*, succeeding Claretie as writer of 'Vie à Paris.' The following year he succeeded Scherer as writer of 'Vie littéraire' in the same paper. His conduct of this dept illustrated his famous definition of the office of a critic: 'Raconter les aventures de son âme au milieu des chefs-d'œuvre.' In 1889 appeared a vol. of stories entitled *Balthazar*. In 1890 came *Thais*, a story of a courtesan of Alexandria converted by the monk Paphnutius. About 1891 A. F. had a literary dispute with Leconte de Lisle, and was obliged to leave the Senate library.

In 1892 appeared *L'Étui de nacre*, containing 15 stories that had come out separately in different pubs., one of them the famous *Procureur de Judée*. In 1893 he left *Le Temps*; and in the same year appeared *La Rôtisserie de la reine Pédauque*, 'a story of magic, somewhat baroque, a little too erudite in places,' but introducing the Abbé Jérôme Coignard, who has been called 'the most graciously eloquent of the author's mouthpieces,' and who reappears in *Les Opinions de Jérôme Coignard*, 1893. Some change of style is noted in *Le Lys rouge*, 1894, a story of passion and jealousy. A return to meditateness marked *Le Jardin d'Épicure*, 1894, and *Le Puits de Sainte-Claire*, 1895.

In 1896 A. F. was elected to the Academy. Soon afterwards the Dreyfus affair became a national scandal, and engaged much of A. F.'s activity for the next few years. It is the main theme of *Histoire contemporaine*, whose hero, the immortal M. Bergeret, voices the ideas of the author throughout 4 vols., *L'Orme du mail*, 1897, *Le Mannequin d'osier*, 1897, *L'Anneau d'améthyste*, 1899, *Mon-sieur Bergeret à Paris*, 1901. About this time he wrote sev. political works: *Opinions sociales*, 1902, *L'Église et la république*, 1904, *Vers les temps meilleurs*, 1907. The very well-known *L'Île des pingouins*, 1908, is a hist. of modern France in fable recalling Voltaire.

Les Dieux ont soif, 1912, had appeared serially as *Feuariste Gamelin*. It is among A. F.'s masterpieces, reproducing the atmosphere of the end of the 18th cent. He visited England in 1913, fraternising with his Socialist comrades there.

In the First World War, A. F.'s occupation being wellnigh gone, he retired to Saint-Cyr-sur-Loire, near Tours. He pub. *Sur la voie glorieuse*, 1915, a collection of patriotic articles; and he protested against the idea of a peace without victory. But the peace as settled was hateful to him, and made him an anti-militarist. In 1921 he received the Nobel prize for literature. His last 2 works, *Le Petit Pierre*, 1918, and *La Vie en Fleur*, 1921, were in continuation of his autobiographic, half-true, half-romantic sketches of a past epoch. His eightieth birthday brought him the homage of all the literary world; 6 months later he d. at La Béchelleraie, Saint-Cyr-sur-Loire. See G. Truc, *Anatole France, l'artiste et le penseur*, 1924; J. L. May, *Anatole France: the Man and his Work*, 1924; N. Séguir, *The Opinions of Anatole France* (trans. by J. L. May), 1928; L. P. Shanks, *Anatole France*, 1932; E. Seillière, *Anatole France, critique de son temps*, 1934; E. P. Durgan, *Anatole France*, 1937; J. Sufel, *Anatole France*, 1946.

France (La République Française), rep. of W. Europe, lying between 51° 5' and 42° 20' N. lat., and 4° 42' and 8° 11' E. long. It is bounded on the NW. by the Eng. Channel and the Strait of Dover, on the NE. by Belgium, Luxembourg, the Saarland, and Germany, on the E. by Switzerland and Italy, on the S. by the

Mediterranean Sea and Spain, and on the W. by the Bay of Biscay. It is well defended by its natural boundaries, the Vosges Mts and the Rhine being on the Ger. frontier, the Jura Mts on the Swiss, the Alps on the Italian, and the Pyrenees on the Spanish (q.v.). Only on the frontier with Belgium is there no natural protection. In shape F. is something like an irregular hexagon. Its greatest length is 600 m. and its greatest breadth 540 m. Area (including Corsica, q.v., and the 4 small frontier dists. added to Fr. ter. by the It. peace treaty of 10 Feb. 1947) 212,659 sq. m.

The coastline of F. is some 1750 m. in length, and is washed by 3 seas: the Mediterranean, the Bay of Biscay, and the Eng. Channel. The Mediterranean coast has sev. good harbours in the E. part, but the W. part is flat and not easy of access. The W. coast generally is deficient in good natural harbours, many of the harbours existing having been constructed at great outlay. The Riviera (q.v.) coast is bold and lofty, but, by contrast, that of the Bay of Biscay is low, with a chain of sand dunes near the shore and many lagoons. In the NW. peninsula of Brittany (q.v.) the coast is rugged and fringed with small is. F. has, however, no is. of importance; Corsica is, geographically, rather a part of Italy, though politically belonging to F., and the Channel Is. (q.v.) belong to England. The biggest is. are Belle Île, Île de Ré, and Île d'Oléron (q.v.). The surface of F. is generally level. High lands are found in the E. and SE. only. The N. and NW. parts, exclusive of the heights in Brittany, consist of low lands which form part of the great central plain of Europe. E. of the dunes, between the Pyrenees and the Gironde, are stretches of infertile, sandy country (see LANDS).

In the S. central part of the country lie the Auvergne Mts. a cluster of heights of volcanic origin rising to between 5000 and 6000 ft, and forming a watershed whence rise the Loire, the Allier, and the Dordogne (q.v.). Between the Auvergne Mts and the Mediterranean is a chain known as the Cévennes (q.v.), which rise to some 6000 ft. Their S. slopes are fertile and sunny, while the N. slopes are high-lying and dreary. N. of the Cévennes and skirting the Rhône and the Saône lies a low range of hills some 2000 ft in height, known as the Côte d'Or (q.v.), while to the E. of the N. portion of the Côte d'Or rises the lower end of the Vosges Mts, some 4000 ft in height. The slopes of the Vosges are covered with thick forests. To the S. of the Vosges are the Jura Mts, separated from the former by a narrow depression through which runs the Saône-Rhine Canal. The Jura Mts are over 5000 ft in height, clothed with forests, and supporting a dense pop., engaged mainly in cattle breeding and agriculture. S. of the Jura Mts, and separated from them by the valley of the Rhône, which here widens out into Lake Geneva, are the Alps, containing Mt Blanc (15,732 ft). The Alps

are divided into sev. chains, including the Pennine Alps in Savoy, with Mt Blanc and the Graian, and the Cottian Alps further S. The Savoy Alps are much visited by tourists, Chamonix being a well-known resort, but the Graian Alps are thinly populated. The Pyrenees on the S. frontier rise to a height of 10,000 ft (Mt Nethon, 11,168 ft) and possess but few passes. The prin. is the pass of Roncevaux (see RONCEVAUX). Other passes are those of Perche and Pertuis in the E., near the Mediterranean coast. Owing to the height of the passes railways do not traverse the Pyrenees, the routes between F. and Spain lying close to the seaboard. In the E. Pyrenees is the little rep. of Andorra (q.v.).

The prin. rivers of F. are the Loire, Garonne, Dordogne, and Adour (q.v.), flowing into the Bay of Biscay, the Seine and Somme (q.v.), flowing into the Eng. Channel, and the Rhône (q.v.), flowing into the Mediterranean. Of these the Loire is the largest, draining—with its tribs.—an area of some 45,750 sq. m., a fifth part of the whole of F.

Climate.—Owing to its proximity to the sea, the climate of F. is, on the whole, temperate. It feels the moderating effect of the Gulf Stream, not, however, to so great an extent as England. The winters are mild and the summer not overbearingly hot. The prevailing wind is westerly, and brings many rainy days, especially on the coast of Brittany, where it rains some 170 days during the year. The rain is, however, very slight, and the ann. rainfall is therefore small, being only some 20 in. Snow is not very heavy in the plains, but is, of course, abundant on the Pyrenees and Alps, as well as in the mountainous dists. of the centre. The NE. highlands have a climate resembling that of central Europe. The climate of Brittany corresponds closely to that of the SW. coast of England, and is more moderate than the rest of F. In Paris the extremes are greater, but even here the average temp. during the winter is 36° F., and the hot spell during the summer is not of long duration. The rainfall in Paris is 150 days per annum. The climate of the Mediterranean seaboard is of a sub-tropical character, the winter being temperate and the summer intensely hot. It is moderated, however, by the 'mistral' (q.v.), a cold, boisterous wind which blows with great force from the central plateau, and which, by driving off the moist air from the Mediterranean, lessens the frequency of rainfall along the Riviera.

Agriculture and Land Tenure.—The soil of France is, on the whole, very fertile, and there are some 12,000,000 workers employed in agriculture. Of a total area of 55,160,000 hectares, 18,668,000 are cultivated, 12,340,000 are pasture lands, 11,352,000 are forested, 5,404,000 are uncultivated, and 1,564,000 are devoted to viticulture (1955 figures). The areas, in hectares, given over to the production of the chief crops are as follows (1955 figures; provisional figures for 1956 in parentheses): wheat, 4,554,000 (3,714,000);

rye, 387,000 (372,000); barley, 1,313,000 (3,290,000); oats, 2,077,000 (2,293,000); potatoes, 1,040,000; beet, 374,000 (379,000). The ann. output of wine is 50-60 million hectolitres, of which some 2-5 per cent is exported. The greatest wine-producing areas are Bordeaux, Burgundy, and Champagne (q.v.), but much *vin ordinaire* comes from the Midi (q.v.). Only in the NW. is no wine produced. Cider and perry are made in Normandy, Brittany, and Maine; and in Nord and Alsace hops are grown for beer. The brandy of Cognac (q.v.) is famous, and there are also the brandies of Armagnac, the marc of Burgundy, the eau-de-vie of Calvados, and a large number of liqueurs (Cointreau, Benedictine, Chartreuse, etc.). Much wine is imported from Algeria, Spain, and Italy. Large quantities of apples, pears, peaches, plums, cherries, apricots, and nuts are grown. In the S. of F. mulberry-trees are specially cultivated for silkworms; the silk industry is encouraged by the gov., and production is carried on mainly in 17 depts, chiefly Gard, Drôme, Ardèche, Var, and Lozère. In 1955 there were 7382 producers, and the yield was 24 metric tons. The chief industrial crops are tobacco, which is a state monopoly, largely grown in the basins of the Garonne and the Rhône, oilseeds, flax, and hemp. Fisheries are important, and the numbers of livestock in the country are (1956 provisional figures): horses, 2,093,000; cattle, 17,792,000; sheep, 8,355,000; pigs, 7,728,000; mules, 31,900 (1955).

Industry.—In mineral wealth F. is poorer than England. Coal and iron are widely diffused, but are found far away from each other, which greatly increases the cost of production. In 1956 the mines of F. produced some 55,000,000 metric tons of coal, and 2,200,000 metric tons of lignite. The prin. coal-fields are in the NE., near Belgium, in the valley of the Upper Loire, around St Etienne, and around Creuzot. The production of iron-ore in 1956 was about 52,680,000 metric tons. The prin. producing dist. is in the valley of the Moselle, near Nancy, Longwy, and Briey; other deposits are worked near Creuzot and in the W. Copper, zinc, lead, tin, nickel, and gold are also produced, but not in nearly sufficient quantities to satisfy the nation's demands. Uranium is mined in Haute-Vienne. Salt is produced from brine pans on the shores of the Mediterranean and the Bay of Biscay, while rock salt is found in great quantities near Nancy. The output of petroleum in 1954 was 505,185 metric tons, of which the greater part came from the Lacq oilfield in the Pyrenees. The important oil-refining industry of the country (Dunkirk, Le Havre, Rouen, Marseilles) is fed with imported crude oil. The production of electrical power in 1955 amounted to 49,827 million kilowatt hrs. of which 52 per cent was hydroelectric power, chiefly from waters in the Alps, Jura, Vosges, and Pyrenees.

F. ranks as one of the leading manufac-

turing countries of the world, and the growth of industry has been encouraged by the rapid increase, post-war, in electrical power. Chemicals, machines and machine tools, motor-vehicles, aircraft, rubber goods, wood products, paper, sugar, porcelain (Limoges, Sèvres), food-stuffs, and leather goods are among the prin. manufs., but the main industry of the country remains the production of textiles and goods made from textiles. The centre of the silk industry is Lyons; other important silk manufacturing tns, apart from Paris, are Nîmes, Tours, and St Etienne. Woollen and cotton goods are chiefly made at Tourcoing, Roubaix, Lille, St-Quentin, and Rouen. Linen goods are made at Lille, Amiens, and other N. tns. The carpets and tapestry of Aubusson have long been world famous. After Belgium F. is the leading country for lace, which is largely manufactured in the NE., especially at Valenciennes. F. is the chief glove-making country of the world, Paris and Grenoble being the centres of the industry. Paris is still looked upon as the fashion centre of the world, and it is also the home of a great number of small industries, particularly the manuf. of perfumes and other luxury goods. The dyeing and calico-printing industries are highly developed, as is the sugar industry (1955, 108 works employing 47,000 people). In 1946, the gov. ordered the creation of a 'First Over-all Plan for the Modernisation and Economic Equipment of the Metropolitan and Oversea Territories,' and the subsequent plans produced under the direction of M. Jean Monnet have led to marked industrial expansion.

Foreign Trade.—The Fr. mercantile marine in 1955 possessed 722 vessels of over 100 tons, with a gross tonnage of 3,597,218. (At the end of the Second World War the gross tonnage of the mercantile marine was 811,000, compared with some 3,000,000 tons pre-war and 2,500,000 tons at the end of 1945.) In 1954 the figures for shipping in foreign trade were as follows: entered 22,470 vessels; cleared 20,933 vessels (39,901,227 net tons). The prin. imports are wine, coal and coke, wool, raw cotton, cereals, oil, chemicals, oleaginous fruits and seeds, machinery, raw skins, timber, rubber, copper, and coffee. The prin. exports are chemical products, iron and steel, textiles, motor cars, wine, soap, perfumes, and glass. In 1956 the value of Fr. foreign trade was (in thousand million francs):—Fr. Union: imports 462.1, exports 521.1; foreign countries: imports 1,514.2, exports 1,100.9. Imports from Great Britain were valued at (in thousand million francs) 109, and exports to Great Britain at 97. The prin. countries from which F. imports are, in order: U.S.A., Federal Rep. of Germany, Great Britain, Iraq, and the Netherlands; and to which F. exports: Federal Rep. of Germany, Switzerland, Great Britain, U.S.A., and Italy.

Communications.—The compactness of Fr. ter. is favourable to the development

of good communications. The country possesses all kinds of stone and road-making materials, and, owing largely to the energy of Napoleon I (q.v.), it has a fine system of highways. There are over 80,300 km. of national roads, 263,500 km. of departmental and intercommunal roads, and 306,100 km. of local roads. The central position of the cap. has made it possible to plan a convenient system of railways radiating to all parts of the country. In 1938 all independent railway companies were incorporated with the existing state railways to form the *Société Nationale des Chemins de Fer Français* (S.N.C.F.), in which the State holds 51 per cent of the shares. The system is divided into 5 regions: Nord; Est; Ouest; Sud-Est (formerly the Paris-Lyon-Méditerranée line); and the Sud-Ouest (formerly the P.O.-Midi lines). The railways converge on Paris from the S. by the Rhône-Saône valley, from the SW. by the Gate of Poitou, from the E. and Switzerland by the Burgundian Gate, and across the Côte d'Or through the junction of Dijon. In 1955 there were 39,800 km. of track, of which 4780 km. were electrified. 509,000,000 passengers were carried, and 191,000,000 metric tons of goods. The country's important system of internal waterways, co-ordinated with those of Belgium and Germany, totals (1955) 8215 km., including 4814 km. of canals, and carries some 50,000,000 tons of freight yearly. Bordeaux and Marseilles are joined by the Canal du Midi, linking the Rhône and the Garonne (q.v.); the Rhône-Rhône Canal connects Strasbourg, Basel, and Dijon, and extensions connect Strasbourg with Calais and the Somme, and Dijon with Paris and the Loire.

The national airline, *Air France*, had, in 1956, 125 aircraft. It is centred on Paris, the 2 chief airports being Le Bourget and Orly, and services Europe, North America, South America, West, Central, and East Africa, Madagascar, the Near, Middle, and Far East, Australia, and Oceania. In 1955 *Air France* flew 56,000,000 ton/km., and carried 1,792,233 passengers.

In 1956 there were 3,116,697 telephone subscribers, of whom 861,778 were in Paris. The receipts on account of posts, telegraphs, and telephones amounted (1954) to 181,101,000,000 francs.

Population.—The soil of F. was occupied in early historical times by a mixture of races, of which the Celtic Gauls (see CELTS) preponderated. The shores along the Mediterranean were occupied by the Ligurians, the SW. by Iberians, and the NE. by the Boigae (q.v.). Subsequently came the invasion of the Phoenicians (see PHOENICIA) and the Greeks, the latter of whom founded Massilia, the present Marseilles. Caesar subjugated the land and laid it open to Rom. influences. At the end of the 4th cent. began the invasion of the Teutonic tribes (see TEUTONS), and in the 9th cent. those of the Norsemen (q.v.) or Normans. This mixture of races has produced the Fr. nation. The Bretons of Brittany,

descended from the anct Celts, have only in recent times become assimilated to the rest of the nation, and some 1,250,000 still use Breton as their native tongue, although about half of them also speak Fr. (see BRETON LANGUAGE). In the S., near the Pyrenees, some 125,000 persons speak Basque (see BASQUES), while Flem. is spoken in Fr. Flanders (q.v.), Walloon in the NE. of F. (see WALLOONS), and German in Alsace and Lorraine. Considerable differences are to be found in the inhab. of the various parts of F. The N. Frenchman is taller in stature, less vivacious than the S., the latter being darker in complexion and of more volatile disposition. The natives of different provs. exhibit different characteristics. The Gascons are loquacious and boastful, the men from the central uplands reserved and slow to make friends; the Breton melancholy and mystical; the Norman tall and self-controlled. As a nation the Fr. are gay and vivacious, renowned for politeness and sociability, artistic in their tastes, frugal and thrifty, capable of periods of great enthusiasm and liable to corresponding periods of depression. They are of great practical sense and extremely good organisers. The pop. of F. at the census of May 1954 was 42,777,174 (including Corsica but not Algeria). The density of pop. was 78 per sq. km.

The following is a list of the 90 depts, with their areas in sq. m. (in parentheses), and their pops. in 1954: Ain (2248) 311,941; Aisne (2866) 487,068; Allier (2848) 372,689; Alpes, Basses- (2697) 84,335; Alpes, Hautes- (2178) 85,067; Alpes-Maritimes (1443) 515,484; Ardèche (2144) 249,077; Ardennes (2027) 280,490; Ariège (1892) 140,010; Aube (2326) 240,797; Aude (2448) 268,254; Aveyron (3385) 292,727; Belfort (235) 99,427; Bouches-du-Rhône (2025) 1,048,762; Calvados (2197) 442,991; Cantal (2229) 177,065; Charente (2305) 313,635; Charente-Maritime (2791) 447,973; Cher (2819) 284,376; Corrèze (2272) 242,798; Corse (3367) 246,995; Côte-d'Or (3390) 356,839; Côtes-du-Nord (2786) 503,178; Creuse (2163) 172,702; Dordogne (3550) 377,870; Doubs (2052) 327,187; Drôme (2532) 275,280; Eure (2330) 332,514; Eure-et-Loir (2291) 261,035; Finistère (2730) 727,847; Gard (2270) 396,742; Garonne, Haute- (2457) 525,669; Gers (2425) 185,111; Gironde (4140) 896,517; Hérault (2402) 471,429; Ille-et-Vilaine (2697) 586,812; Indre (2664) 247,436; Indre-et-Loire (2377) 364,706; Isère (3178) 626,116; Jura (1951) 220,202; Landes (3604) 248,943; Loir-et-Cher (2478) 239,824; Loire (1852) 654,482; Loire, Haute- (1930) 215,577; Loire-Inférieure (2693) 733,575; Loiret (2629) 360,523; Lot (2017) 147,754; Lot-et-Garonne (2078) 265,549; Lozère (1996) 82,391; Maine-et-Loire (2811) 518,941; Manche (2475) 446,860; Marne (3167) 415,141; Marne, Haute- (2420) 197,147; Mayenne (1986) 251,522; Meurthe-et-Moselle (2036) 607,022; Meuse (2408) 207,106; Morbihan (2738) 520,978; Moselle (2403) 769,388; Nièvre (2658)

240,078; Nord (2228) 2,098,545; Oise (2272) 435,308; Orne (2371) 274,862; Pas-de-Calais (2606) 1,276,833; Puy-de-Dôme (3090) 481,380; Pyrénées, Basses- (2977) 420,019; Pyrénées, Hautes- (1750) 203,544; Pyrénées-Orientales (1598) 230,285; Rhin, Bas- (1848) 707,934; Rhin, Haut- (1354) 509,647; Rhône (1104) 966,782; Saône, Haute- (2014) 209,303; Saône-et-Loire (3330) 511,182; Sarthe (2410) 420,393; Savoie (2388) 252,192; Savoie, Haute- (1744) 293,852; Seine (185) 5,154,834; Seine-Inférieure (2448) 941,684; Seine-et-Marne (2275) 453,438; Seine-et-Oise (2184) 1,708,791; Sèvres, Deux- (2337) 312,842; Somme (2443) 464,153; Tarn (2231) 308,197; Tarn-et-Garonne (1440) 172,379; Var (2333) 413,012; Vaucluse (1381) 268,318; Vendée (2690) 395,641; Vienne (2711) 319,208; Vienne, Haute- (2119) 324,429; Vosges (2303) 372,523; Yonne (2892) 266,410. See the individual articles on the depts.

At the 1954 census there were 24 tns with pops. of more than 100,000. They were: Paris (2,850,189); Marseilles (661,492); Lyons (471,270); Toulouse (268,863); Bordeaux (257,946); Nice (244,360); Nantes (222,790); Strasbourg (200,921); Lille (194,616); St Etienne (181,730); Toulon (141,117); Le Havre (139,810); Nancy (124,797); Rennes (124,122); Reims (121,145); Rouen (116,540); Grenoble (116,440); Clermont-Ferrand (113,391); Dijon (112,844); Le Mans (111,891); Brest (110,713); Roubaix (110,067); Limoges (105,990); Angers (102,142) (see separate articles on these tns).

The div. of the pop. according to occupation in 1954 was as follows: out of an active pop. of 19,182,000 there were 6,443,000 manual workers (1,358,000 engaged in building and public works, 1,153,000 in agriculture, and 1,090,000 in textile and allied industries), 3,984,000 farmers, 1,450,000 shopkeepers, 736,000 artisans, 85,000 industrialists, 2,074,000 clerical workers, 1,139,000 intermediate employees, 1,004,000 workers in salaried services, 554,000 members of the liberal professions or senior employees, and 525,000 miscellaneous (including armed services, police, and clergy).

The 1954 census showed that there were 1,453,479 foreigners in the country.

Religion.—Since 1905 no religion has been officially recognised by the State. By the 'Law of Separation' of that year, the Churches were separated from the State, and, in the case of the Rom. Catholic Church, the Concordat of 1802 was abolished; the adherents of all creeds were authorised to form religious associations (*associations cultuelles*). By a law of 2 Jan. 1907 it was provided that, failing *associations cultuelles*, buildings for public worship would continue at the disposition of the ministers of religion and their congregations, but in each case an administrative act would be required from the civil authorities. There are at present about 12,000,000 Rom. Catholics, and about 800,000 Protestants. The seats of the Rom. Catholic archbishops are at Aix,

Albi, Auch, Avignon, Besançon, Bordeaux, Bourges, Cambrai, Chambéry, Lyons, Marseilles, Paris, Reims, Rennes, Rouen, Sens, Toulouse, and Tours. The Protestants of the Augsburg Confession are governed by a General Consistory, and the Reformed Church is under a Council of Administration.

Education.—The beginning of the present century saw the triumph of the State in its long struggle with the Church for the control of education in F. Previous to 1880 the Church controlled its own primary and secondary education, and had the power of granting univ. degrees; after 1880 primary education under State control became free and compulsory, and the privileges of the Church were taken away. Religious teaching was abolished in the schools at the same time.

The State elementary schools, the basis of Fr. education, are divided into primary, secondary, and higher classes. There is a Supreme Council (52 members) with administrative and deliberative functions, and a Consultative Committee to advise on the functioning of the school system, but the inspectors-general are in direct communication with the Minister. For local administration the country is divided into 17 academic areas, each of which has an Academic Council which deals with all grades of education. The law of 9 Aug. 1879 made it obligatory for each dept to maintain 2 *écoles normales* for training elementary teachers. Future teachers, after spending 3 years in a secondary school, receive professional training at *Instituts de Formation professionnelle*. The law of 16 June 1881 made education free in all elementary state schools, and that of 28 Mar. 1882 made it obligatory for all children from 6 to 13 years of age; the law of 9 Aug. 1936 extended the upper age limit to 14 years. The law of 30 Oct. 1886 estab. the position of private schools under State supervision, and provided that teachers should be lay. In 1942 the higher elementary schools (*écoles primaires supérieures*) were transformed into modern schools (*collèges modernes*), and are now part of the system of secondary instruction. Higher elementary education is given also in continuation schools (*cours complémentaires*) attached to the elementary schools. In 1953-4 there were 4287 infant schools (including 211 private schools) with 642,500 pupils, and 80,857 elementary schools (including 10,691 private schools) with 5,282,500 pupils. Secondary education is free (since 1934) and is given in state *lycées*, in colleges belonging to the coms., and in schools belonging to associations or private individuals. The course of study lasts for 7 years. In 1953-4 the number of pupils at secondary schools was 871,421, of whom 372,974 were at private schools.

The law of 18 Mar. 1880 granted the State faculties the exclusive right to confer univ. degrees. The 17 univs., with their dates of foundation and, in parentheses, the numbers of students attending them in June 1954, are as follows:

Aix-Marseille, 1409 (8906); Algiers (5950); Besançon, 1485 (1074); Bordeaux, 1441 (9057); Caen, 1432 (3469); Clermont-Ferrand, 1808 (2391); Dijon, 1722 (2277); Grenoble, 1339 (4271); Lille, 1530 (7077); Lyons, 1808 (8989); Montpellier, 1289 (6695); Nancy, 1572 (4949); Paris, 1150 (62,395); Poitiers, 1432 (4486); Rennes, 1735 (6613); Strasbourg, 1567 (5497); Toulouse, 1230 (7109).

In 1954 the numbers of students in state institutions, by faculties, were:

the *École Pratique des Hautes Études* (hist. and philology, science, and theology); the *École Normale Supérieure*, which prepares secondary teachers; the *École des Chartes*; the *École des Langues Orientales vivantes*; the *École du Louvre*; the *École des Beaux-Arts*; and others. There are also a number of institutions of higher or technical instruction dependent on other ministries, giving courses in applied sciences, social economy, commerce, forestry, colonial agriculture, veterinary science, engineering, mining,



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law, 41,368; medicine, 29,603; science, 39,493; letters, 39,700; pharmacy, 7638; theology, 313.

The *École libre des Sciences Politiques* in Paris became the *Institut d'Études Politiques* of the univ. after the Second World War, and other schools of political science were estab. (e.g. at Bordeaux, Toulouse, and Strasbourg). One of the functions of these schools is the preparation of entrants for the *École Nationale d'Administration* which trains the higher grades of the home and foreign civil service. Other institutions of higher learning are the *Collège de France* (founded 1530), which has courses in literature, the sciences, and economics; the Museum of Natural History, which has courses in science and natural hist.;

etc., besides military and naval schools. Technical schools of a lower grade under the Ministry of Public Instruction are numerous.

Finance.—F. favours indirect rather than direct taxation, i.e. on commodities rather than on persons. Before 1914 the old direct tax system, the *Quatres vieilles Contributions*, was in operation—taxes on real estate, on doors and windows, on business, and on presumptive income. Only the first exists to-day, and only in a modified form. In 1907 Caillaux, finance minister in the Clemenceau Cabinet, proposed the suppression of the old taxes and the creation of a new income tax. Fiscal reform was still under discussion on the declaration of war, which found F. as financially unprepared as she was in

1939. By 1914 the public debt had grown to 33,000,000,000 fr., and was to become 300,000,000,000 fr. by 1926. Half the public debt was floating or short-term debt, but whereas before the war the service of the debt took about 1,000,000,000 fr. (20 per cent of the Budget), after the war it amounted to 18,000,000,000 fr. out of a State expenditure of some 40,000,000,000 fr., while civil and military pensions accounted for 5,000,000,000 fr. During the war F. lived on borrowing, and a war profits tax, instituted in 1916, failed to compensate for the expenditure. The pre-war income tax scheme was not applied until 1917. Immediately after the armistice Fr. financial policy was based on the assumption that Germany could pay a sum estimated at the huge figure of 100,000,000,000 gold marks. By the Act of June 1920 the tax system was revised and the business turnover tax introduced, together with higher rates of income tax. After 1921 F. entered on a period of inflation in order to meet the cost of reconstruction, and the policy of borrowing continued until, in 1923, the net borrowings amounted to nearly 16,000,000,000 fr. During the occupation of the Ruhr the value of the franc declined, and the Morgan bank of New York put at the disposal of F. 100,000,000 dollars' worth of credits. In 1924 the Poincaré Gov. proposed an all-round increase of taxes and drastic economy cuts, but in the May elections of that year Poincaré was defeated on his financial policy. The franc was then at 67 to the pound sterling; by 1926 it was at 250 to the pound. Poincaré was again called upon to form a ministry of national union, and later that year the franc was stabilised at about 160 to the pound and 33 to the dollar. A Bill was put through the chamber providing for 100,000,000,000 fr. of fresh taxation, and an independent sinking fund was established.

In 1938 the Fr. internal debt was 384,849,000,000 fr., and the foreign debt (as at 1934) was 3,863,650,000 dollars, owed to U.S.A., and 2755,875,000 sterling owed to Britain. The commercial debt to the U.S.A., England, Japan, Holland, Argentine, etc., was about 5,000,000,000 gold francs. In 1928 the stabilisation law was passed, fixing the franc at a fifth of its normal value, i.e. at 65.5 mg. of gold instead of 322.6 mg. Fr. financial policy, as formulated in 1937, was opposed to all forms of exchange control, and adhered to the principles of the 3-power monetary agreement of 1938 between Britain, F., and the U.S.A., which was, in itself, a condemnation of such control. At the end of 1944 the internal debt was consolidated, 581,110,000,000 fr., floating, 1,028,444,000,000 fr.; total, 1,609,554,000,000 fr. On 8 Feb. 1944 a financial agreement between the Brit. Gov. and the Fr. Committee of National Liberation fixed the rate of exchange at 200 fr. to the pound. A financial agreement between Great Britain and F. was concluded in Paris (27 Mar. 1945) containing 'the necessary financial foundation

for the resumption and development of commercial intercourse' between the franc and sterling zones, including reciprocal credits (£100,000,000 in London for F. and 20,000,000,000 fr. in Paris for Great Britain) to finance imports.

At the end of 1954 the total Fr. national debt was 5,648,770,000,000 fr. Since 1949 the fr. has been pegged by the gov. at 450 fr. to \$1 U.S.A. On the devaluation of sterling in Sept. 1949 the rate was made 980 fr. to £1.

Justice.—The laws of F. were codified at the beginning of the 19th cent. at the instigation of Napoleon Bonaparte, and are still in force with but few amendments (see CODE NAPOLÉON). The administration of justice in F. is organised under 4 systems, known as *juridiction civile*, *juridiction commerciale*, *juridiction administrative*, and *juridiction correctionnelle et criminelle*. Within the first system come all civil cases between individuals, and these are adjudicated upon by the *tribunaux civils*. All commercial suits within the usual category are judged by the *tribunaux de commerce*, which adjudicate also upon cases of bankruptcy, there being no separate bankruptcy courts. The third system, *juridiction administrative*, comprises all actions against the gov., these being submitted to the *tribunaux administratifs*. The fourth system *juridiction correctionnelle et criminelle*, covers all application of the penal law—by the *tribunaux correctionnels* for the repression of misdemeanours and by the courts of assize for criminal cases. The jury system is adopted for these latter only. Minor civil cases are tried before a justice of the peace (*juge de paix*), one being appointed to each canton. Civil cases outside the jurisdiction of the *juge de paix* are tried in the first instance before *tribunaux civils* of first instance, which exist in every *sous-préfecture*. The *tribunal civil* may also adjudicate in commercial cases where a separate *tribunal de commerce* does not exist. Appeal against the decisions of civil and commercial tribunals is made to one of the courts of appeal, of which there are 25. The special jurisdiction over commercial cases is administered only in those districts, where a *tribunal de commerce* has been established by the gov. Fr. law does not allow any act of the administration to be submitted to the ordinary courts. Special tribunals, called *conseils de préfecture*, exist in every *préfecture* to adjudicate in all cases between individuals and gov. agents. Appeals against the decisions of these tribunals are made by the *conseil d'état* in Paris. Appeal against the decisions of the correctional tribunals and the courts of assize can be made only to the court of cassation, which exists to ensure the proper application of Fr. law. It has authority over all the tribunals of F., civil, commercial, administrative, and criminal. There is a special system of law for and special tribunals for the adjudication of questions in which the State or its officials are concerned (see DROIT ADMINISTRATIF).

Defence.—The armed forces are under the supreme command of the President of the Rep. The national defence is the responsibility of the President of the Council; he is assisted by the Staff of National Defence. The Army is composed of regular officers, long-term non-commissioned officers and soldiers, conscripts serving a period of 18 months, and reservists. The High Command comprises the chief of the general staff and the chief of the army staff. There are 9 military regions in metropolitan F. Peace-time units are divided into tactical groups and territorial units, and are composed of infantry, armoured troops and cavalry, artillery, engineers, pioneers, transport and supply troops. There are also the commissariat, and the medical and veterinary services. The *Gendarmerie* (see GENDARMES) is a separate arm. Officers are trained first in the school for all arms at Coët-Quidan (Brittany), and later in separate technical schools according to their arms of the service. There are also staff colleges (the *École d'État-major* and the *École Supérieure de Guerre*), and the *Institut des Hautes Études de Défense Nationale*, where defence problems are studied jointly by high-ranking officers and civilians. In 1953 the effectives were fixed at 565,000 officers and men, including 57,000 gendarmes.

The Navy is manned chiefly by volunteers, but partly by conscription. It is administered by the secretary of state for navy, the chief of naval staff, deputy chief of naval staff, and deputy chief of naval staff (air). In 1956 the active personnel numbered 67,935. The strength of the fleet in 1956 was: 4 aircraft carriers, 2 battleships, 5 cruisers, 24 destroyers, 50 frigates, and 16 submarines. The estimates for 1957 included a helicopter carrier, 4 frigates, and 3 submarines.

The *Armée de l'Air* and the Naval Air Service are under reorganisation. Their strength in 1953 was 117,000 officers and men.

French Oversea Possessions.—The status of oversea depts and ters. within the Fr. Union is governed by Articles 73–82 of the Fr. Constitution. These possessions are classified as follows (see individual articles):

1. Algeria.
2. *Oversea Departments.*
 - (i) Martinique.
 - (ii) Guadeloupe.
 - (iii) Réunion.
 - (iv) Guiana.
3. *Oversea Territories.*
 - (i) *French West Africa.*
 - (a) Senegal.
 - (b) Sudan.
 - (c) Mauritania.
 - (d) Guinea.
 - (e) Ivory Coast.
 - (f) Upper Volta.
 - (g) Dabomey.
 - (h) Niger.

(ii) *French Equatorial Africa.*

- (a) Gabon.
- (b) Middle Congo.
- (c) Ubangui-Chari.
- (d) Chad.
- (iii) Madagascar.
- (iv) Comoro Archipelago.
- (v) French Somaliland.
- (vi) New Caledonia.
- (vii) French Oceania.
- (viii) St-Pierre and Miquelon.
4. Fr. Togoland and Fr. Cameroons.
5. *Anglo-French Condominium.*
New Hebrides.
6. Cambodia.

Political Parties.

1. Parti Communiste Français (P.C.) (*Fr. Communist party*).
2. Union Progressiste (*Progressive party*).
3. Section Française de l'Internationale Ouvrière (S.F.I.O.) (*Socialist party*).
4. Parti Républicain Radical et Radical-Socialiste (*Radical party*).
5. Union Démocratique et Socialiste de la Résistance-Rassemblement Démocratique Africain (U.D.S.R.-R.D.A.) (*A Republican and Socialist party*).
6. Rassemblement des Gauches Républicaines et du Centre Républicain (R.G.R.).
7. Mouvement Républicain Populaire (M.R.P.) (*A Progressive Right-Wing party*).
8. Indépendants d'Outre-Mer (I.O.M.) (*Affiliated to the M.R.P.; asks for electoral reform in overseas ters., and a federal constitution for the Fr. Union*).
9. Indépendants et Paysans d'Action Sociale (I.P.A.S.) (*A Right-Wing party*).
10. Groupe Paysan (*Affiliated to the I.P.A.S.; special interest in status of agric. workers*).
11. Groupe des Républicains Sociaux (G.R.S.) (*Formerly the Rassemblement du Peuple Français; opposes present part. system as unstable and ineffective*).
12. Union et Fraternité Française (U.F.F.) (*the Poujadist party*).

Local Administration.—The country is composed of coms., each of which elects a mayor and communal council to control its affairs. Every group of 10 or more coms. forms a canton, and the cantons are further grouped into arrons. Each arron. elects a council which controls local taxation. The arrons. are grouped into depts, each of which contains on an average some 4 arrons. The depts have replaced the old historical provs. into which F. was formerly divided, and are 90 in number, including Corsica. The following is a list of the old Fr. provs., together with the depts to which they roughly correspond: Alsace-Lorraine (Moselle, Rhin-Bas, Rhin-Haut); Angoumois (part of Charente-Maritime); Anjou (Maine-et-Loire, parts of Sarthe, Mayenne,

and Indre-et-Loire); Artois (part of Pas-de-Calais); Anis (part of Charente-Maritime); Auvergne (parts of Puy-de-Dôme, Cantal, and Haute-Loire); Avignon (part of Vaucluse); Béarn (Basses-Pyrénées); Berri (Cher and Indre); Bourbonnois (parts of Puy-de-Dôme, Creuse, and Cher); Brittany (Finistère, Côtes-du-Nord, Morbihan, and Loire-Inférieure); Burgundy (Saône-et-Loire, Côte-d'Or, and parts of Yonne and Nièvre); Champagne (Ardennes, Marne, Aube, and Haute-Marne, and parts of Aisne, Seine-et-Marne, and Yonne); Dauphiné (Drôme, Hautes-Alpes, and Isère); Flanders (Nord); Foix (part of Ariège); Franche-Comté (Doubs, Haute-Saône, and Jura); Gascony (Landes, Gers, Hautes-Pyrénées, part of Basses-Pyrénées); Guienne (Gironde, Dordogne, Lot-et-Garonne, Lot, Tarn-et-Garonne, Landes, Gers, parts of Hautes-Pyrénées, Haute-Gironde, Ariège, and Basses-Pyrénées); Ile-de-France (Seine-et-Oise, Seine-et-Marne, Aisne, Oise, parts of Eure-et-Loir, Loiret, and Yonne); Languedoc (Tarn, Aude, Hérault, Gard, Ardèche, parts of Haute-Loire, Haute-Garonne, and Tarn-et-Garonne); Limousin (Corrèze, part of Haute-Vienne); Lorraine (Mourthe-Moselle, Meuse, and Vosges); Lyonnais (Rhône and Loire); Maine (Mayenne); Marche, La (Creuse); Nivernais (Nièvre, part of Cher); Normandy (Seine-Inférieure, Calvados, Manche, and Orne); Orléannais (Loiret, Loir-et-Cher, and parts of Eure-et-Loir, Nièvre, and Yonne); Picardy (parts of Pas-de-Calais, Somme, Nord, Oise, and Aisne); Poitou (parts of Vienne, Vendée, and Deux-Sèvres); Provence (Bouches-du-Rhône, Var, Basses-Alpes, and part of Vaucluse); Roussillon (Pyrénées-Orientales); Saintonge (part of Charente-Maritime); Touraine (part of Indre-et-Loire).

Constitution and Government.—The preamble to the constitution of the Fourth Rep. (in force 24 Dec. 1946; modified by the Constitutional Law of 7 Dec. 1954) reaffirms the declaration of 1789 and the fundamental principles recognised by the laws of the rep., and proclaims, besides, a number of political, economic, and social principles as especially necessary to-day. These include equal rights for women with those of men; the right of asylum for those persecuted in their struggle for liberty; the right to work; freedom from victimisation in employment on account of beliefs, opinions, or origins; the liberty to defend one's rights and interests by syndicalist action; the right to strike within the law; collective ownership of any undertaking which has acquired the character of a national public service or *de facto* monopoly; national assurance to the individual and his family of the conditions essential to their development; guarantee to all, especially children, mothers, and the aged, of safeguards for health, material security, leisure, and rest; the solidarity and equality of all Fr. people in sacrifices resulting from national calamities; equal educational and cultural opportunity for all; and the organisation

of free, public, lay education at all stages to be a State obligation. The preamble further declares that F. will undertake no war of conquest nor use its armed forces against the freedom of any people; subject to reciprocity F. assents to restrictions on her sovereignty essential to the organisation and defence of peace; and enters with her overseas peoples into a union founded on equal rights regardless of differences of race or creed—this Fr. union to comprise nations and peoples who pool their resources and efforts to develop their respective cultures and ensure their security. The preamble concludes with the declaration that F. intends to promote self-gov. among her dependent races so that they may manage their own affairs democratically; and, avoiding any arbitrary system of colonisation, guarantees to all equality of access to public office, and to the exercise of the rights and liberties set out in this regard in the constitution. Many of the provisions of the constitution which follow the preamble are reaffirmations of the constitution of the Third Rep. prior to 1940 by way of repudiating the reactionary principles of Marshal Pétain (q.v.); thus is reaffirmed the principle of 'government of the people for the people and by the people.' In matters constitutional the people exercise their sovereign rights through the votes of their representatives and by referendum. The franchise is given to both sexes. Parliament consists of the National Assembly and the Council of the Rep. The assembly is elected by direct universal suffrage, the council by indirect suffrage through cons. and depts. The assembly can itself elect councillors to a number not exceeding one-sixth of the total number of members of the council. The number of members of the council may not be less than 250, or more than 320. The council is re-eligible to the extent of one-half. Sessions may not be interrupted by adjournments for a longer total period than 4 months. Both Houses sit at the same time. Sessions are public. Each chamber elects its committee annually, and when the Houses are in joint session for the election of the president of the rep. their committee is that of the assembly. When the assembly is not sitting its committee can convene Parliament; and it must do so on the demand of a third of the deputies or on that of the president of the council of ministers. Legislation is initiated by the president of the council of ministers and the members of Parliament. Propositions of law formulated by the Council of the Rep. are transmitted without debate to the assembly, but are not valid if they involve a reduction of revenue or increased expenditure. Budgets are the prov. of the assembly, but the budget Bill may contain no other than strictly financial provisions. The initiation of expenditure is vested in the deputies in the National Assembly. The Council of the Rep. advises on Bills and propositions of law transmitted by the assembly after first reading, and if its opinion is unfavourable

or not given within a specified time, the law will be promulgated in the text as voted by the assembly. If remitted with amendments the assembly will give the measure a second reading, accepting or rejecting the council's amendments in whole or in part; the vote on second reading is then taken publicly, and, on an absolute majority, after a further vote by the council in the same conditions, the measure becomes law. No one may be a member of both the National Assembly and Council of the Rep. An economic council examines Bills within its competence, as submitted by the assembly. The president of the rep. is elected by Parliament for 7 years, and is only re-eligible once. He appoints the council of ministers and the councillors of state. He communicates with Parliament by messages addressed to the assembly. The functions of the president are incompatible with the exercise of any other public functions. The president, after the customary consultations, chooses the president of the council of ministers or Premier, who submits to the assembly the programme and policy of the Cabinet he proposes to constitute. The Premier and Cabinet cannot be appointed until the Premier has received the confidence of the assembly by an absolute majority. Confidence can only be refused by an absolute majority, and the passing of a vote of censure involves the resignation of the whole Cabinet. The constitution provides for dissolution of the assembly following 2 ministerial crises within a period of 18 months. General elections take place at earliest in 20 days and at latest in 30 days after the dissolution. Ministers are criminally responsible for crimes and offences committed in the exercise of their duties; they may be charged by the assembly and sent before the high court chosen by the assembly at the beginning of each new chamber. The organisation and procedure of this court are determined by a special law. There is provision for a superior council of the magistracy composed of 14 members under the presidency of the president of the rep. and vice-presidency of the minister of justice, 6 members chosen by the National Assembly and the others including 4 magistrates. Revision of the constitution is decided by resolution of an absolute majority of the assembly. After a second reading within 3 months the assembly frames a Bill, which is then submitted to Parliament, and voted on as an ordinary law. It is then submitted to a referendum, except where it has been adopted on its second reading by a two-thirds majority of the assembly, or voted by a majority of three-fifths by each of the 2 Houses. No constitutional revision respecting the existence of the Council of the Rep. can be effectuated without the consent of the council, or by recourse to a referendum. A constitutional committee, presided over by the president of the rep., and comprising the presidents of each House, 7 members chosen by the assembly, and others,

decides whether any law voted by the assembly in effect revises the constitution. If it does the law is sent back to the assembly for fresh deliberation. If Parliament adheres to its original vote the law cannot be promulgated before the constitution has been revised by the process described above. The republican form of gov., however, cannot be the subject of any proposed constitutional revision.

The Fr. union is formed, as to one part, of the Fr. rep., comprising metropolitan F. and the depts and ters. overseas, and, as to the other part, of the associated ters. and states. The gov. of the rep. co-ordinates their combined defensive resources and directs the policy appropriate to that defence. The central organs of the union are the presidency, the high council, and the assembly of the union. The president of the Fr. rep. is president of the union. The council consists of a delegation of the Fr. Gov. and of the representatives of the associated states, and its function is to assist the gov. in the general conduct of the union. The assembly of the union consists, as to half, of members representing metropolitan F., and as to the other half of members representing overseas and associated ters. The members are elected by the territorial assemblies so far as concerns overseas depts and ters.; and, as concerns metropolitan F., as to two-thirds by the members of the National Assembly, and as to the remaining third by the members of the Council of the Rep. The associated states may designate delegates within the limits and conditions fixed by the legislation of each state. The president convenes the assembly of the union, and closes the sessions. He must convene it on the requisition of half the members. The assembly has cognisance of Bills and proposals submitted for its advice by the National Assembly or the gov. of the Fr. rep. or the gov. of the associated states. In the overseas ters, the legislative power belongs to the Parliament as regards criminal legislation, public liberties, and political and administrative organisation; in all other matters Fr. law is applicable only by express provision, or if extended to the overseas ters. by decree on the advice of the assembly of the union. One of the chief criticisms of this constitution is that the president of the rep. ought to be in the position of an arbiter, and therefore elected by secret ballot, for the president should have no personal power and power should rightly be vested nowhere else but in the assemblies. M. Edouard Herriot (q.v.) thought that, as regards the assembly, the constitution gave no political powers, but rather privileges, so that the House was merely a kind of academy of moral and political science, rather in the position of a doctor called in for consultation, but without authority to sign a prescription. Another fundamental objection is that there is no separation of powers such as will be found, for example, in the Brit., Amer., and other democratic constitutions. It is open to doubt whether the constitution is con-

sistent with an independent judiciary or an administration above party; for, as to the former, the council of the magistracy comprises only 4 magistrates out of 14 members; and as to the latter it might seem that the country is split into a series of departmental compartments, separated from each other by different administrations. Extreme left-wing critics objected that in 1845 the people had condemned the Senate by an overwhelming majority, whereas in the new constitution the Senate reappeared under a new name. The objection that the constitution



E.N.A.

BRETON PEASANT GIRL

institutes indirectly gov. by assembly is, however, hardly consistent with a president of the rep. elected by both Houses who, after 18 months of a new legislature's existence, can dissolve the assembly; which body confers on him, in accord with the president of the Council of the Rep., the exceptional right to suspend a law for unconstitutionality; nor is such criticism consistent with a constitution which gives to the Council of the Rep. the initiative in legislation, and the power to nominate an important fraction of the assembly of the Fr. union and committee of constitutional control. Finally it may be objected that the Council of the Rep. is deprived of all powers, and that by the very manner of its election it does not represent the coms. of F., and is merely the pale reflection of an omnipotent assembly.

National flag.—Blue, white, and red in vertical stripes.

National anthem.—*La Marseillaise* (words and music by Claude Rouget de Lisle, q.v.).

The Arts.—See FRENCH ARCHITECTURE; FRENCH ART; FRENCH LANGUAGE AND LITERATURE; FRENCH MUSIC.

History.—The Phoenicians and Greeks had left their trade mark in Gaul by the estab. of the trading station which afterwards developed into the tn of Marseilles, but that was all. With the invasion of Gaul by Julius Caesar, however, the recorded hist. of F. begins. The Gauls rapidly assimilated the civilisation and culture of Rome; they adopted a form of its language, they accepted its laws and its administration. But with the decline of the Rom. Empire Gaul's prosperity rapidly disappeared. She began to suffer from the invasions of the outside barbaric tribes, and the burdens placed on the peasantry by the native aristocracy and clergy led to the outbreak of many revolts which were cruelly suppressed. From c. 395 onwards the Goths, Vandals, and Burgundians, who had long been pent up E. of the Rhine, began their attacks upon the W. The Burgundians were the first to settle, and they founded a kingdom which stretched down the Rhine valley from the Vosges to the sea. The Vandals founded a Visigothic kingdom in Spain, a kingdom which, however, included that part of Gaul which Caesar had called Aquitaine, together with a part of the Celtic domain. In 451 at the great battle of the Catalaunian plain Aetius, the last of the Romans in Gaul, defeated the Huns of Attila. The most important of the barbaric invaders of Gaul was Clovis I (q.v.), the Merovingian king of the Franks. The Franks were a Teutonic tribe who had lived in Belgium (the Salian Franks) and on the banks of the Sambre and the Meuse (the Ripuarians). Led by their king (Clovis, 481-511), the Franks invaded Gaul and quickly overran it, advancing rapidly towards Paris, which they made their cap. The master-stroke of the Frankish king Clovis was his adoption of the Christian faith. He was recognised by Rome; he was made a consul and patrician by the emperor of the E. The Franks maintained their old Salic law, but at the same time they adopted the civilisation of Rom. Gaul. Clovis was the founder of the Merovingian line of kings. Up to the time of the conquest of Gaul the Merovingians had been but chieftains of roving tribes; now, however, they aspired to the monarchy of F., and with it inherited to a very great extent the imperial ideals which were kept up by the officials who represented their power throughout the land, and who were chosen from the native inhab. of the land. The king held in his own hands the reins of justice, finance, and administration. But the Merovingian line soon spent much of their time quarrelling amongst themselves, and so grew up the power of the mayors of the palace, who gradually won for themselves a position

which was greater than that of the king himself. A long line of puppet Merovingians followed; then for a short time a struggle between mayor and king would take place, but the mayors of the palace won, and the line of *rois fainéants* continued only as long as the mayors of the palace cared to let them. The Merovingian line was maintained nominally until 751. The greatness of the Carolingian dynasty begins with the mayor of the palace, Charles Martel. Charles Martel was responsible for the overthrow of the Arabs at Tours (732). In 741 he d., and was succeeded by his sons, Carloman, who shortly retired to a monastery, and Pepin, known as Pepin the Short, who finally, in 751, took the name as well as the power of king. The bishops of Rome were at this time just rising to a full realisation of their power and claiming recognition as the heads of the Church. The rising powers of the papacy, joined to the rising power of the Carolingians, were wellnigh unconquerable, and Pepin was not slow to recognise the benefits of such an alliance. He made himself the protector of the Church; twice he invaded Italy and forced the king of the Lombards to cede him possessions which he in turn ceded to the papacy, and thus gave the papacy its claim to temporal greatness, which was to persist up to 1870. Pepin d. in 768, and was succeeded by his son, Charlemagne (q.v.). He continued and improved on the policy of his father: he crossed the Alps to the help of the papacy; he restored the gift of Pepin the Short; he crushed the Lombards. Then he turned his attention to the Saxon and the Arab, and after many campaigns he finally crushed their power too. He fought the Avars of Hungary; he defeated the Danes; and he was to all intents and purposes overlord of W. Europe. On Christmas Eve of the year 800 he was crowned with the imperial crown by the pope. Thus was re-established the medieval ideal of a united Church and empire: the domination of the world by pope and emperor working together for its good. The immediate results of this coronation were that the papacy became the greatest power in Italy, and the title of Charlemagne to the Frankish kingdom was considerably strengthened. Charlemagne, although he had realised the very real danger which threatened the empire from the incursions of the Danes, nevertheless helped in the disruption of his own empire by the diva. he himself made. This empire was split up and divided between his sons Charles, Pepin, and Louis. The 2 former d. very shortly after their father, but Louis the Pious partitioned his empire whilst his sons were yet alive, and this led to constant quarrelling and revolt. Finally, after his death, the empire was definitely partitioned between his 3 sons, and the 3 kingdoms of F., Germany, and Italy may be said to have been founded by this partition (treaty of Verdun, 843). For the next century and a half the hist. of F. and of the Holy Rom. Empire is the story of constant war and

rebellion. The great enemies of order and the power of the crown during this period were the baronage and the Northmen. Rouen, Bordeaux, and Aachen all fell into the hands of the Northmen. Paris itself in 886 underwent a terrible siege. The king (Charles the Fat) tried to buy them off, but they came again and again, each time with fresh demands. The Northmen settled at the mouths of the rivers, and from there ravaged the country. Charles the Fat was driven from the throne, and Count Odo elected king of F., but he owed his election solely to the need of driving away the Northmen, and he was kept on the throne only by the influence of the nobles. In 911 Charles the Simple, who had succeeded Odo, made peace with the Northmen, and ceded to them Normandy (the mouth of the Seine). Their leader, Rollo (q.v.), became a Christian, paid homage to the king, and settled in his own ter. The Northmen soon showed that they were easily able to assimilate the culture, language, and customs of the Fr., and before long had become a Fr.-speaking nation while still retaining the vigour of their original race. Charles the Simple showed himself as incapable as Charles the Fat, and rapidly the Carolingians became as weak as the Merovingians had been, but they still retained some of their former power. Louis IV tried hard to win back prestige for the crown, and to put down the power of the nobles, but Hugh, count of Paris, overshadowed him. Although Hugh could easily have declared himself king of F., he maintained the old Carolingian line, leaving it to his son, Hugh Capet, to found the Capetian dynasty. In May 987 Louis V d., the last of the direct line of the Carolingians, and Hugh Capet was recognised king by the Church and the baronage. It was the victory of the feudal system over the monarchy. The first few Capetian kings were merely great feudal nobles who were given the royal title and a nominal allegiance. Hugh Capet added to an effete power the Ile-de-France and Paris, and he was the first Fr. king with *national* ideals. But the power of these early Capetian kings was but nominal. The influence of Normandy must not be overlooked. The Normans had taken part in all the great movements of the time; they had supported the Clunian Reformation, they had supported the Capetian dynasty, and although they owed allegiance to the Fr. king, they were in reality much more powerful than he. Henry I tried conclusions with Normandy and was defeated. Baldwin of Flanders, father-in-law of the Conqueror, and regent for Philip I, did not hinder William, duke of Normandy, from invading England. In the meantime the Fr. kings had revived the anct Carolingian claims to the middle kingdom and to sovereignty over the Church, but the great struggle of empire and papacy was within sight, and Hildebrand, with his ideals of the universal power of the papacy, was preaching them during the reign of Philip. Philip I struggled against William of Normandy toward the end of

his reign, and quarrelled with the papacy, being excommunicated. During his reign occurred the First Crusade.

Under Louis VI the Capetian monarchy began to expand rapidly. Louis V had quarrelled with the papacy; Louis VI by an alliance with the Church strengthened the power of the crown. He attacked the power of Henry I of England in Normandy, and attempted to check the power of the counts of Blois. The house of Blois, however, was strengthened by the accession of Stephen of Blois to the crown of England; this was temporarily

rebellious sons of Henry II he prepared the way for the break-up of the power of the Angevins. In 1191 he took part in the Third Crusade. Before Richard of England's return he had attempted to seize the greater part of Normandy, but had failed, and Richard built up a strong alliance against him. But in 1199 the death of Richard and the accession of John made clear the way for the overthrow of Angevin power in F. The battle of Bouvines (1214) consolidated the power of F. in the N. Finally the Albigensian Crusades gave Philip a hold



D. McLeish

AMIENS AND ITS CATHEDRAL

One of the best examples of Gothic architecture in France, begun in 1220

neutralised by the marriage in 1137 of Louis's son to the heiress of Aquitaine. Louis VII's reign saw a reaction of the feudal baronage against the power of the crown, which was, however, repressed. In 1152 Louis VII divorced Eleanor of Aquitaine, who 6 weeks afterwards married Henry of Anjou, king of England and ruler of the Angevin Empire. Henry II's power was by far the greatest danger which the monarchy in F. had yet to face. By his marriage Henry II had estab. an empire, which extended from the Pyrenees to the Cheviots; he ruled in F., Normandy, Maine, Anjou, Touraine, Gascony, Aquitaine, and Poitou. The accession of Philip Augustus (1180-1223) marks the highest point to which the monarchy had risen. By skilful attacks on the house of Blois he consolidated Fr. power in the N., and by alliances with the

on the S., a hold which was strengthened by his son and grandson. Administration, justice, law, had all been firmly estab. during his reign, and in 1223, when Philip d., he left a F. strong, consolidated, and powerful in the councils of Europe.

Louis VIII (1223-6) continued the work of his father. His son, Louis IX (1226-1270), usually known as St Louis, was only 12 years of age when his father d. His mother, Blanche of Castile, ruled for him, and during the period of the regency there was a feudal reaction. The power of the Crown was greatly extended during this reign in the S., and Henry III's attempts to reconquer the former Fr. possessions of his house were a failure. One of the most important features of Louis IX's reign was the development of the Parlement de Paris, and the subjugation of the feudal nobles by depriving them of their

rights to judicial combat and private war. During his reign also was developed the univ. of Paris. He was succeeded by Philip III (the Bold) (1270-85), during whose reign progress continued steadily. Events outside F. influenced its hist. to a very great extent. The Sicilian Vespers put an end to the power of the Fr. in Italy, where Charles of Anjou, a clever and unscrupulous brother of St Louis, had estab. a kingdom, whilst the provs. of Anjou, Toulouse, and Auvergne, together with Provence, fell into the hands of the Crown. Champagne was also united to

of the monarchy in F. During Louis X's reign there was a feudal reaction and the nobles increased their power. On his death his daughter was declared incapable of ascending the throne by reason of the Salic law. His brother therefore succeeded him, and finally, with Charles IV who ruled only 6 years, the Crown passed from the main line of the Capetians to the cadet house of Valois. Almost at once, Edward III claimed the throne of F. by right of his mother, and so caused the Hundred Years War (q.v.). He had a number of concrete reasons for wanting



The Rank Organisation

A SCENE FROM THE BRITISH FILM 'HENRY V.' SHOWING FRENCH AND ENGLISH TROOPS IN THE BATTLE OF AGINCOURT

the Crown during this reign. Philip IV (1285-1314) was cunning, unscrupulous, and ambitious. He desired to weld F. into one compact kingdom, and to extend her power. In 1286 he had recognised Edward I's claim to Gascony and Aquitaine, but taking as a pretext the quarrels between the sailors of the Cinque Ports and the men of Normandy, Gascony and Aquitaine were declared forfeited.

Edward now built up an alliance against Philip, and Philip in turn allied himself with the Scots, and so began the traditional alliance which lasted down to 1660. In 1300 he annexed Flanders to F., but was 2 years later defeated at Courtrai (1302). This victory was important, because it showed the beginning of the overthrow of the feudal cavalry by an efficient infantry. The death of Philip saw the beginning of a rapid decline in the power

an excuse to crush an apparently weak F.; chief among these were the constant Fr. interference in Flanders, which threatened the Eng. woollen trade, and Fr. aid to the Scots. But Edward's chief motive was personal ambition. At first England scored a number of significant victories. Sluys was won in 1340, Crécy in 1346, and in the following year Calais surrendered. For 3 years war was stopped by the outbreak of the Black Death (1347-50), and in 1350 Philip VI *d.* He was succeeded by John II (1350-64), who was defeated and captured by the Black Prince at Poitiers (1356). The regency of the Dauphin Charles during the imprisonment of King John led to an attempt on the part of the states-general to control the policy of F., and this, being opposed by the baronage, led to civil war and the peasant rising known as the

Jacquerie (q.v.). In 1360 peace was made with England. By this treaty Edward gave up his claim to the Fr. throne, and received large tenns. to the S. of the Loire. In 1364 John d. Charles V (1364-80), who succeeded John, was fairly successful in establishing again the power of the Crown.

Charles, however, failed to annex Brittany, although he was successful against both the Eng. and Spaniards. However, he depended largely for his success upon the generalship of Bertrand



Mansell

JOAN OF ARC AT THE CORONATION
OF CHARLES VII AT REIMS

From the painting by Ingres

du Guesclin (q.v.), who had adopted defensive tactics. The regency which was necessary owing to the minority of Charles VI (1380-1422) saw another feudal reaction. Charles became definitely insane in 1392; this led to the quarrels between the powerful families of the Orleanists (Armagnacs) and the party of Burgundy. The dukes of Burgundy had by this time become powerful princes, whose ambitions tended to make them less and less Fr., until Charles the Bold actually attempted to found an independent kingdom. The Burgundians allied themselves with the Eng., and obtained control of the mad Charles. Henry V, renewing the quarrel with F., won the battle of Agincourt (q.v.) (1415), and later, with the help of the Burgundians, overran the N. of F. and forced the Fr. to sign the treaty of Troyes. By this treaty Henry V became regent of F., married the king's daughter, Catherine,

and was to succeed to the Fr. throne on the death of the king. Henry, however, d. before Charles VI, and his young son, Henry VI, was proclaimed king on the death of Charles. Simultaneously with the proclamation of Henry VI in Paris, Charles VII was proclaimed at Bourges. Although the duke of Bedford ruled capably as regent, he was able only to control the N. of F., and the conduct of the other Eng. regents soon drove the Burgundians into the arms of the Fr. national party. The encouragement which Joan of Arc's (q.v.) victories gave to the Fr. had also helped in bringing about the ultimate downfall of Eng. power. In 1435 the treaty of Arras was concluded between the Burgundians and the Fr. In the following year Paris was recaptured. Gradually the conquests of the Eng. were won back until by 1453 Calais alone remained in the hands of the Eng. king.

Louis XI ultimately did much to strengthen royal power in F., though the beginning of his reign was hardly propitious. He alienated Charles the Bold of Burgundy, his nobility, and his clergy, and drove his enemies to join together in the league of Public Weal. Later, however, he fomented rebellions in Flanders, and whilst Burgundy was occupied in putting them down he won back Normandy, which by the treaty of Conflans he had ceded without interference. After 1467 he successfully opposed the schemes of Charles the Bold. He managed to hold his own until the failure of Warwick and the Lancastrians in England brought his fortunes to a low point. He was already at war with Burgundy. Charles aimed at occupying the ter. of Lorraine and extending his possession down to the Mediterranean. He found that his scheme evoked considerable opposition and tried to occupy the attention of Louis by encouraging an Eng. invasion of F. Edward IV, however, was bought off by Louis at the treaty of Pequigny and returned to England. Charles the Bold was finally killed at the battle of Nancy in 1477. Louis then seized Burgundy and Artois, and finally it was arranged by treaty between Maximilian and Louis that Margaret, the heiress of Burgundy, should marry the Dauphin Charles and bring as her dowry the country of Burgundy and Artois. Louis had at last triumphed. He d. in 1483. F. was governed immediately after his death by the regent, Anne of Beaujeu. The great achievement of the regency was the marriage of Charles VIII to Anne of Brittany, in face of the opposition of the powers of Europe and her marriage by proxy to the Emperor Maximilian.

The hist. of modern F. really begins with the reign of Louis XII. The death of Charles VIII had again raised the vexed question of the succession in Brittany, and this was solved by the marriage of Louis XII to Charles's widow, Anne. He remitted much taxation, and gave the country an opportunity of becoming prosperous and wealthy. His reign was

one long pattern of tortuous diplomatic intrigue; first in the league of Cambrai (1508) he fought with the papacy against the growing power of Venice; next by the Holy League (1511) he found himself deserted by his one-time allies, and although Gaston de Foix won for him some successes in Italy, he was forced to make peace. England had once more come to the front as a European power, and by the battle of the Spurs (1513) helped to weaken the power of F. Louis *d.* in 1515. The reign of Francis I (1515-47) marks the beginning of the struggle between the house of Hapsburg and the Fr., the estab. of the Fr. military prestige, the beginning of the alliance between F. and Turkey, and the origin—due to the growing influence in F. of Calvinism—of the religious wars. Francis won the battle of Marignano (1515), and forced from the papacy a concord which gave him practical control of the Church in F. He became a candidate for the empire in 1519, but was unsuccessful, and in 1525 was defeated at Pavia, captured, and taken a prisoner to Spain. Here he signed the treaty of Madrid, but failed to keep the terms of that treaty, and so the war dragged on during his reign. Many attempts were made to end it, e.g. at Cambrai, but it was not until towards the end of the reign that the treaty of Cr py recognised the actual facts. Francis had inaugurated the royal policy of being Catholic in his policy at home and Protestant abroad. Under his successor, Henry II (1547-59), the Protestants were persecuted bitterly in F., although Henry's struggles with Charles V made a continuance of the pro-Protestant policy necessary abroad. Charles attacked Metz, but was unsuccessful, and finally he resigned the crown of Spain to his eldest son. But the war with F. dragged on, chiefly owing to the influence of the Guises in F. Calais was won back in 1552, and in 1559 the treaty of Cateau-Cambr sis put a period to the struggles of the Hapsburgs and the Fr.

The next decades of Fr. hist. are dominated by the wars of religion. During the succeeding 30 years the real power lay in the hands of the nobility. Chief amongst the leaders of the nobles were the family of Bourbon, which was Huguenot, and which was represented by Antony of Bourbon and his brother Cond ; and the family of Ch tillon, represented by the statesman and warrior Coligny, adm. of F., also Huguenot; on the other side were the Guises, who, during the reign of Francis II (1559-60), gained great influence, partly owing to the fact that the queen (Mary Queen of Scots) was their niece. The power of the Guise family declined when Francis II *d.* Charles IX (1560-74), a boy of 10, succeeded, and the regency was exercised by the queen-mother, Catherine de' Medici (q.v.). In 1562 the Guises precipitated the religious wars by killing a number of Huguenot soldiers, and the fighting thus started dragged on from 1562 to 1598. Though religious prin-

ciples were involved and though many sincere Catholics and Protestants fought and *d.* for those principles, the wars were at least partly a struggle for power between 2 opposing court factions, and the last Valois rulers attempted, with varying success, to maintain the balance between them in order to preserve the monarchy itself. Between 1562 and 1570 the civil war broke out 3 times. Each time war was ended by a promise of toleration to the Huguenots, and finally, in 1570, the Huguenots were given good terms in the treaty of St Germain. This treaty was due largely to the growing feeling in F. that the real enemy of Fr. national unity was Spain, and Charles IX planned a united attack of Protestants and Catholics on Spain. Charles IX, between 1570 and 1572, was under the influence of Coligny, and to counter this Catherine de' Medici swung over to the Guises. Her jealousy of Coligny led her to instigate his murder, and this in turn led to the notorious massacre of St Bartholomew (1572) (q.v.), though it is now generally acknowledged that Catherine had no conscious intention of precipitating a slaughter of Protestants on this scale. The fifth civil war saw the rise to power of that body known as the Politique. This was an association of men who desired only the peace of the realm, and who supported the Huguenots with that aim during this war. Henry III (1574-89) declared at first for toleration, and later against the Huguenots. Finally he acknowledged the Protestant Henry of Navarre his heir, and had Guise assassinated. Further fighting followed. Paris rose in revolt against the king, who joined with Henry of Navarre and besieged it. Henry III was, however, assassinated himself, and the Catholic League, whose avowed object was to prevent Henry of Navarre ascending the throne, was victorious for the time being. Henry of Navarre (1589-1610) was now lawful king, but the league for the time being refused to recognise him. Henry defeated the league at Arques (1589) and at Ivry (1590). He next besieged Paris; dissensions were already breaking up the league, and in 1593 Henry, who for a long time had refused to change his creed, became a Catholic, and was recognised by the states-general as king of F. In 1598 was signed the treaty of Vervins, by which Spain kept but little, and Calais was restored to F. With the aid of Spain taken away, the Catholic League collapsed, and order was restored in F.

The reign of Henry IV, the first of the Bourbons, saw the rehabilitation of the monarchy and the country after the prolonged civil wars. The Edict of Nantes was issued in 1598. By this edict toleration was granted the Huguenots. Henry's minister Sully (q.v.) reformed the finances and justice, and helped to curb the power of the nobles, thus helping forward the aggrandisement of the Crown. Henry IV was assassinated in 1610, and was succeeded by his son, Louis XIII (1610-43). The regency

was left in the hands of Marie de' Medici, the queen-mother, and the nobles began to gain power again. Finally Condé headed a rebellion which resulted in the calling of the states-general for the last time before 1789 (1814). The central figure of interest during the reign of Louis XIII is Richelieu (q.v.), who from 1624 to 1642 dominated the policy of F. Richelieu's foreign policy was directed towards establishing F. as the greatest country in Europe; his domestic policy aimed at the aggrandisement of the Crown. The age of Louis XIV is the logical conclusion of both the foreign and domestic policy of the cardinal. The Thirty Years War broke out in 1618, and although F. was not directly concerned, nevertheless, in order to aim a blow at Austria and Spain, Richelieu supported Gustavus Adolphus of Sweden in his attacks against the Catholics. In 1635 F. intervened actively in the fighting, with decisive effect. In his domestic policy Richelieu was equally successful. He crushed the right of private war, he summoned no states-general, he took away many of the extraordinary privileges of the Huguenots. The Parlement de Paris was subordinated to the royal will and the power of the Crown was centralised. During the first 18 years of the reign of Louis XIV Mazarin (q.v.) was the chief minister, and followed in the footsteps of Richelieu, but he was unable to exercise quite the same firm control. Abroad the victory of Condé at Rocroi made F. the greatest military power in Europe, and this victory was followed in 1645 by the victory at Nordlingen. The result of these victories was that in the treaty of Westphalia, which was signed in 1648, F. was given Lorraine, the bishoprics of Metz, Toul, and Verdun, together with Pinerolo in Italy. At home, however, matters were more disturbed. Two civil wars broke out, known as the first and second Fronde. The first or *parl.* Fronde aimed at obtaining various concessions from the Crown. This was ended by the treaty of Rueil. Immediately afterwards the second or aristocratic Fronde broke out. This was led by Condé, and was at first strikingly successful. It was aimed against Mazarin, and was, in fact, an attempt on the growing powers of the Crown. But eventually the Crown and the minister triumphed, and in 1658 the second Fronde was finally put down. The treaty of Westphalia, while it had ended the struggle between the empire and F., had, nevertheless, extended the war into Spain. In 1659, however, was signed the treaty of Paris, by which the Spaniards ceded some ter. on the Pyrenees.

A marriage alliance was arranged between Louis XIV and Maria Theresa, the daughter of the Sp. king. This marriage was celebrated in 1660. In the following year Mazarin d. and Louis XIV became his own chief minister. Louis had resolved to be absolute. He adopted Richelieu's foreign policy of territorial aggrandisement. To Colbert (q.v.), who

had charge of the finances of the country during the early part of Louis's reign, F. owed much. He fostered trade and commerce; the East and West Indies were exploited, settlements were made in India, and the colonies in North America were extended. To a great extent Louis XIV owed the success of his foreign policy to the financial reforms and the increase of trade and wealth for which the wise administration of Colbert was responsible. But Louis had hopes of dominating Europe which were destined to lead F. into a series of wars from which her economy was not to recover until after the Revolution. The war of Devolution broke out in 1667, just after the death of Philip IV. The extension of the power of Louis XIV over the Netherlands, however, alarmed England and Holland, who formed an alliance with Sweden to prevent Louis from carrying out his aim. Louis, however, who had already agreed with Austria that when Charles II of Spain d. the Sp. dominions should be divided, made peace and withdrew from the Netherlands (1668). His next war was with the Dutch (1672-8). By the treaty of Nimegen, which ended it, the Fr. made great gains in the N. Louis now turned his attention to acquiring the Rhine as the boundary of F. By means of *chambres de réunion*, he estab. claims to all Alsace, Lorraine, and Luxembourg, and by the treaty of Ratisbon (1684) he was allowed to keep what he claimed for 20 years.

But Louis's policy of blatant aggression had raised up for him enemies all over Europe. The *réunions* had made the empire and Spain unfriendly; Holland was, of course, still hostile; and England after 1688 became, under William III (q.v.), the centre of opposition to the ambitions of F. In 1685 he made a terrible blunder in his domestic policy in deliberately revoking the Edict of Nantes. The immediate result was that tens of thousands of her most industrious citizens left F. In the meantime the policy of James II in England had brought on the revolution of 1688. The appearance of a fugitive James II at the Fr. court was a crushing blow to Louis. F. was now surrounded by enemies. The war of the Protestant Succession immediately broke out. The war was waged in Germany, where Louis cruelly laid waste the Palatinate; in Ireland, where the last hopes of the Jacobites were crushed; on the sea, where, by the battle of La Hogue (1692), the sea power of England was finally estab.; and in the Low Countries, where the war rapidly became simply a war of sieges. By the treaty of Ryswick, Louis gave up all conquests, with few exceptions, gained since 1678. But the treaty was merely a truce. The king of Spain was dying, and the still ambitious Louis turned to the definite estab. of Bourbon power in Europe. William III and Louis signed 2 partition treaties, both of which, however, were broken, one by the death of the Electoral Prince Joseph and the second by the acceptance of the will of Charles

II (leaving his dominions to Louis's grandson, Philip of Anjou) by the Fr. king. Louis immediately overran the Sp. Netherlands with Fr. troops, and when James II d. recognised his son as James III of England. England immediately put herself at the head of the alliance against F., and the war of the Sp. Succession (q.v.) broke out. It lasted from 1702 to 1713. The Fr. military power was broken by the great victories of the allies at Blenheim, Ramillies, Oudenarde, and Malplaquet, but the successes of the allies in Spain were but transient, and the capture of Gibraltar (1704) was the most important event. The Fr. fought bravely, and by their rally at the end of the war, and also owing to the desire of the Tory party in England for peace, they gained terms at the treaty of Utrecht which their earlier performances in the war had certainly not justified. Philip of Anjou was given Spain, the Barrier was restored to Holland, and Austria was given the Sp. Netherlands, together with the It. possessions formerly belonging to Spain. Louis d. in 1715.

Louis XV, his great-grandson, succeeded him. It was not until after 1729 that the birth of a Dauphin finally dispelled the hopes of succession to the Fr. throne which Philip V had, and drew together the Fr. and Sp. Bourbons into a family alliance. The early rule of Louis XV was complicated by the Polish Succession war and the struggles of Austria and Russia against Turkey. F. was still true to her old policy of alliance with Turkey. Fleury had just succeeded in regaining for F. a foremost place amongst the powers of Europe when the war of the Austrian Succession broke out. Whether England or F. was to be supreme in India and America was the question which had now to be decided. The war had begun as an attempt on the part of F. still further to injure the power of the house of Hapsburg in Europe, but after 1743 it became a struggle with England for the colonies. F. and Spain declared war against Austria and England. The war was fought in Germany, America, and India. In 1745 Fontenoy was won by the Fr. Frederick of Prussia withdrew from the war in 1746, and the peace of Aachen was signed in 1748. The peace was in truth but a truce, and simply restored the *status quo*. The period between the end of the war of the Austrian Succession and the outbreak of the Seven Years War was filled with dissensions in F. itself. The minister, Machault, attempted to break down class privileges, but failed. The power of the Church and of the nobles was increased, and it was only war that saved F. from revolution. By 1756 India had practically been lost by the recall of Dupleix, and war was going on in America. In 1756 was accomplished that diplomatic revolution which united the interests of the Hapsburgs and Bourbons, and opposed them to England and Prussia. Such was the state of affairs when the Seven Years War broke out. The Fr. were successful in Europe and America up to 1758, but

during 1759 the series of Eng. victories at Lagos, Quiberon Bay, and the Heights of Abraham (Canada) brought the colonial power of F. down to the lowest level it had yet reached. Her power in India was overthrown by the surrender of Pondicherry. In Europe she had been almost equally unsuccessful, and the battle at Rossbach broke the military power of F. until the revolution. By the treaty of Paris F. ceded Canada and North America to England. Minorca passed into Brit. hands, and she had to compensate Spain with Louisiana. Between 1763 and 1774 F., under the ministry chiefly of Choiseul, was engaged in internal reform and also in an attempt to raise afresh the strength of the navy for a renewed struggle with Brit. power. At home a struggle was also going on between the Jesuits and the minister, supported by the Parlement de Paris, both of whom held Jansenist views. The Society of Jesus was abolished in F. in 1762. F. maintained her alliance with both Austria and Spain, and in 1770 Marie Antoinette, archduchess of Austria, married the Dauphin. Before the end of the reign (1774) Choiseul had been dismissed. F. was fundamentally weak; the monarchy decadent and distrusted, the nobility privileged and hated, whilst the abuses in the Church had made it unpopular with a large section of the people. Louis XVI (1774-93) attempted reforms; but the influence of Marie Antoinette during this period was pernicious. The reforms of Turgot were frustrated by her, whilst Necker was dismissed in 1781, after having attempted to manage the finances of the country for 6 years. During the Amer. War of Independence F. supported the colonies. Her minister, Vergennes, directed her policy with such effect that her intervention won the Americans recognition of their independence, and restored to F. some of the lost prestige.

After the Amer. war Fr. ministers tried various means of reform to stave off national bankruptcy, but finally public opinion in F. became so strong that the king was obliged to call the states-general for May 1789, and to restore Necker as his minister. The literary influences which had operated to bring about the revolution were many. The writings of Montesquieu, the Encyclopédistes, Voltaire, and Rousseau had concentrated public opinion on the feudal abuses of F., and, most important of all, the *Contrat Social* of Rousseau had been widely read and as widely influenced the Fr. intelligentsia, from whom the leaders of the Revolution sprang. The states-general met on 5 May 1789. The third estate immediately demanded that the assembly should meet together and not in its 3 orders. In June they adopted the title of the National Assembly and banded themselves together by an oath to make a new constitution. The king, unnerved by the tendency of events, concentrated his troops round Paris. Mirabeau demanded the disbandment of the troops;

the king refused and dismissed Necker; the National Guard was formed by the people, and the Bastille stormed and taken (14 July). The fall of the Bastille led to the recall of Necker, whilst all over the country it influenced the formation of national guards and attacks on the castles of the feudal nobility. The assembly now debated the Rights of Man, and proceeded to abolish all feudal privileges. The gov. was to be by means of a single chamber, and the royal veto was only potent for 6 months. In Oct. the assembly moved to Paris, whither the king had been conducted by the mob. In June the king attempted to flee the country, but was captured at Varennes and brought back. In 1791 a new constitution was promulgated. The assembly then passed a self-denying ordinance and dissolved itself (Sept. 1791). The new assembly met in Oct. It was composed chiefly of Girondists (the Moderate party) and the Mountain (or Extremists), who were divided into 2 factions, the Jacobins, led by Robespierre, and the Cordeliers led by Danton and Desmoulins. In 1792 war broke out between Austria and F. The ill success of the Fr. arms at the beginning of the war infuriated the mob, who on 10 Aug. stormed the royal palace, slaughtered the Swiss guards, and overthrew the monarchy. A new ministry at once came into office, the war was pursued with more vigour, and Dumouriez won the battle of Valmy (20 Sept.). The National Convention declared F. a rep., and the Austrians were overthrown at Gemappes. European war was imminent. F. soon found herself opposed by Spain, Portugal, and Austria, together with England and Holland. The Sept. massacres of 1792, the work of the Extremists, were condemned by the Girondists, who, however, were finally outvoted by their opponents, who tried and executed Louis XVI (Jan. 1793). In July of the same year the Girondists were overthrown, and the Committee of Public Safety was instituted. F. was now in the grip of the Jacobin Robespierre (q.v.) and a reign of terror followed. At first Robespierre's policy was successful both at home and abroad. La Vendée (q.v.) was crushed, the allies were overthrown, and F. was freed from threats of invasion; but the revolutionaries quarrelled amongst themselves, and Robespierre himself was guillotined. After the death of Robespierre affairs in F. became less violent. In 1795 the Directory was formed. This was the first attempt to set up a reactionary gov. The gov., opposed by the forces of the Moderate as well as the Extremist party, was soon faced with another revolution. After putting down the insurrections by means of Napoleon's famous 'whiff of grapeshot,' it estab. the constitution of the year III, and set up a republican form of gov., which consisted of 50 directors and 2 councils. The policy of the Directory was at first successful at home and abroad; the reaction of the Royalists, who were in the majority in the councils, was put down, and the 11.

campaign ended in the advantageous peace of Campo Formio (1797). England was now left alone to fight F., and Napoleon (q.v.), the Directory's general, left Europe to fight in Egypt. When he returned he found that a second coalition had been formed against F., and the Fr. had been driven out of Italy. F. was on the verge of civil war when Napoleon, aided by Sieyès and Barras, carried out the revolution of 19 Brumaire (1799), destroyed the Directory, and set up the consulate. Napoleon estab. himself as first consul and was soon virtual dictator of F. He undertook his spectacular 11. campaign, where, by the victories of Marengo and Hohenlinden, he forced Austria to accept the peace of Lunéville (1801). The armed neutrality of the N. was initiated to overthrow the power of Britain; but this failed, and after the accession of Alexander I the Russians withdrew from their Fr. alliance. England and F. made peace by the treaty of Amiens. During the short interval of peace Napoleon reorganised the central gov., estab. a sound system of education, and healed the schism in the Church by his concordat with the papacy. He also reduced the Fr. law to order by means of the Code Napoléon. In 1804 Napoleon was declared emperor by the Senate, and crowned himself at Notre Dame. In 1803 the war broke out again, and the life of Napoleon for the next 12 years is the hist. of Europe. Trafalgar was fought in Oct. and Austerlitz in Dec. 1805; Austria was forced to make peace at Pressburg (1805); Germany was split up and divided into states such as the confederacy of the Rhine; Prussia was destroyed at Jena and Auerstädt; and Russia reduced to terms by the victories at Eylau and Friedland (treaty of Tilsit, 1807). Napoleon, by means of the continental system, tried to overthrow the power of Britain, but eventually failed, because F. herself could not ultimately do without Brit. supplies (see CONTINENTAL SYSTEM). Finally, when Napoleon emerged from the Russian campaign, he was plunged into the War of Liberation (1813). The battle of the nations (16-18 Oct. 1813) saw Napoleon's forces utterly defeated by a combination of Germans, Austrians, and Russians. Still Napoleon refused to make peace, and the allies entered F. from the N., whilst Wellington routed the Fr. in the S., and proclaimed Louis XVIII. Napoleon abdicated, and was exiled to Elba, whilst the first treaty of Paris was signed (1814). The settlement of Europe was still under discussion when Napoleon escaped from Elba, landed in F., and rallied the Fr. around him. The campaign known as the Hundred Days took place, and Napoleon, finally defeated at Waterloo (18 June 1815), abdicated, surrendered to the Eng., and was exiled to St Helena, where he d. in 1821. F. became a monarchy again under Louis XVIII. Almost immediately there was a Royalist reaction in F., and in 1830 the reactionary ordinances of Charles X led to the revolution of July, and the Bourbon monarchy fell in F. for

ever. Louis Philippe was declared king of the Fr., and the policy of the Fr. ministry under him was relatively liberal in tendency. England, F., Spain, and Portugal united together in the Quadruple Alliance, which was brought to a close by the Near E. problem, in which Thiers, whilst nominally allied to Britain, worked against her interests in the Mediterranean.

Guizot succeeded Thiers, and remained in office until 1848. Although he acquired Algeria, he did much to foster bad feeling between England and F. The question of the marriage of the queen of Spain brought open rupture between the 2

gave Napoleon. But there was still much opposition to Napoleon from the Republicans, and this opposition was met by repressive measures which really weakened Napoleon's power. In 1858 he went to war in alliance with Italy against Austria, but having defeated the Austrians at Solferino he withdrew from the alliance and made peace, leaving the question of It. unity to be settled later by Cavour and Garibaldi. The Prussian-Austrian war was viewed at first with equanimity by Napoleon, but the victory of Prussia and the knowledge that Ger. unity was a probability of the near future filled him



Louvre

'THE CORONATION OF NAPOLEON' (1804), BY DAVID

countries, and F. found herself practically isolated in Europe. Domestic discontent culminated in the revolution of 1848, when Louis Philippe abdicated, and a rep. was set up. Finally a constitution which gave a president elected by the people was estab. Louis Napoleon, a nephew of Napoleon I, was elected president (1848). In 1851 Louis Napoleon carried out his *coup d'état*. A new constitution was issued. The president was to be elected for 10 years; there was to be a senate (nominated by the president) and a legislative council (elected by the people). In 1852 Louis Napoleon re-estab. the empire and proclaimed himself emperor as Napoleon III (q.v.). In 1854 England and F. in alliance fought the Crimean war. In 1856 the treaty of Paris ended the war, and declared the Danube free and the Black Sea closed to warships, but nevertheless neutral. Turkey was to carry out various reforms, but the most important result was the prestige which it

with dismay. F. was again isolated in Europe. The succession question in Spain and the putting forward of a candidate of the house of Hohenzollern (who was, however, speedily withdrawn) led to the Franco-Prussian war. The Fr. were unprepared, and were defeated at Worth and Sedan, when Napoleon III was taken prisoner.

The empire in F. fell, and under the gov. of national defence tried to oppose the Germans. Metz, however, where Bazaine was holding out with 170,000 men, surrendered, and Paris was besieged. In 1871 Paris capitulated, and peace was signed. A huge war indemnity was demanded, and Alsace and E. Lorraine ceded. The Commune was set up in Paris: the prov. gov., under Thiers, had difficulty in obtaining possession of the cap. For the next 2 years Thiers ruled F., and succeeded in establishing order and restoring the finances. Much quarrelling ensued, however, as to the constitution

which F. ought to adopt, and Thiers was driven by opposition from a conservative position to an extremist one, and was then driven from power (1873). He was succeeded by MacMahon. The period of the Third Rep. was definitely inaugurated by the decree of Jan. 1875, which organised the rep. under what was called the constitution of 1875. MacMahon, however, was considered too conservative in sympathy, and in 1879 he was succeeded as president by Grévy. The Republican party after this victory split into divergent groups—the Democratic Liberals, the Radicals led by Gambetta, and the Radical-Socialists of whom Clemenceau was spokesman. In opposition the Monarchists, Bonapartists, and Clericals formed a coalition, and exploited the ambition of Boulanger (q.v.) to overthrow the rep. Grévy resigned in 1887, and was replaced by Carnot. Boulanger was charged with high treason, and fled. The Moderate Republican party hoped for the support of the Catholics, but gov. prestige was weakened by the scandal connected with the bankruptcy of the Panama Company, 1892. Meanwhile, Socialism was becoming an organised force in F. and Jaures became the Fr. Socialist leader in 1893. In the next year Carnot was assassinated. A wave of anti-Jewish feeling surged over F. during the Dreyfus affair (1894–1906) (q.v.), which acquired so great a political significance that the very stability of the rep. was threatened. The Waldeck-Rousseau ministry settled this affair with Loubet as president in succession to Faure, the anti-Dreyfusard. A major problem confronting Waldeck-Rousseau and his successor was that of the Church, and this resulted in 1905 in the separation of Church and State.

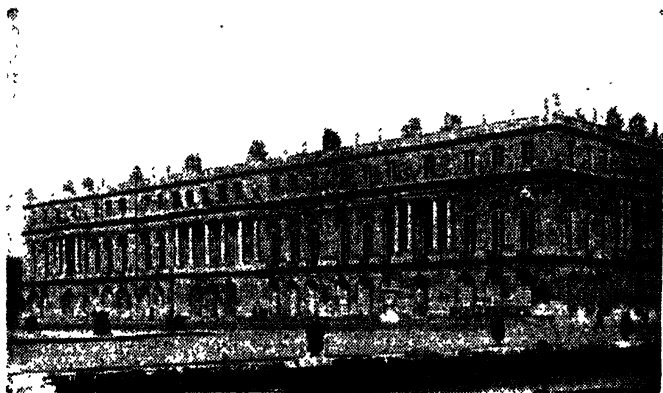
One feature of pre-1914 Fr. politics was the growth of syndicalism, especially within the Confédération Générale du Travail, formed in 1895. The Clemenceau ministry of 1906 was faced with extreme labour troubles, and fell in 1909, a new Cabinet being formed by Briand (q.v.), who continued in office until the elections of 1910. Fr. foreign policy to this date had been one of colonial expansion, which in Tunis provoked a dispute with Italy (1881–3), in the Congo and in Egypt with England, especially the Fashoda (q.v.) incident in 1898, and in Morocco with Germany in 1905 and 1911. The conquest of Tunisia caused Italy to form the Triple Alliance with Germany and Austria (1882), and this was countered by the Dual Alliance between F. and Russia in 1891. Fr. politics in the early 20th cent. were divided over reconciliation with Germany, advocated by Caillaux, and *rapprochement* with England. The latter policy, supported by Clemenceau, resulted in the Entente Cordiale between F. and England (1904). The Agadir incident of 1911, which F. regarded as an attempt to establish Ger. influence in a Fr. sphere, nearly led to hostilities. The elections of 1910 had been fought over proportional representation, and

electoral reform was accepted by the Caillaux Cabinet of 1911. In 1912 Caillaux was defeated over his policy of reconciliation with Germany, and in opposition a Poincaré ministry was formed. In 1913, however, Poincaré was elected president in succession to Fallières. The prospect of war found F. neither morally nor materially ready. With the Austro-Serbian crisis and the murder of the Archduke Ferdinand (see FRANCIS FERDINAND) at Sarajevo on 28 June 1914 war became imminent. President Poincaré visited the Tsar Nicholas II at St Petersburg in July, and immediately after his return Austria presented Serbia with an ultimatum which was followed by a declaration of war on 28 July. Russia had been forced into partial mobilisation by Austria's attitude, and Germany demanded Russia's complete demobilisation without putting similar pressure on Austria. Russia refused, and Germany declared war on Russia on 1 Aug. The Ger. mobilisation was directed against F. and Germany declared war on 3 Aug. (for fuller details of the war in F. see WORLD WAR, FIRST; and the various military campaigns listed separately). The Ger. invasion of Belgium caused England to declare war on Germany on 4 Aug. The Fr., who had organised their defensive line on the Lorraine frontier between Germany and F., were not prepared for the violation of the neutrality of both Belgium and Luxembourg. In Paris a truce was called to party politics by a *union sacrée*, and Viviani reconstructed his Cabinet.

Paris was soon threatened by the Ger. advance, and on 2 Sept. the gov. withdrew to Bordeaux. Gen. Gallieni (q.v.), military governor, was left in control of Paris, and by dispatching the 'army of Paris' to the front in taxi-cabs he contributed to Joffre's success in the battle of the Marne (5–12 Sept.). The hist. of F. for the next 4 years is that of the war itself. Fr. industries were concentrated in the N. and NE., and the Ger. occupation crippled their activity. Nearly all the iron and half the coal resources were also under Ger. control, but F. developed her industries in the unoccupied regions with amazing energy. But internal political dissensions weakened F. during the first 3 years of the war. In Dec. the Fr. Gov. returned to Paris. The fall of the Viviani ministry followed upon the failure of allied diplomacy in the Balkans, and in Oct. 1915 a new ministry was formed by Briand. Gallieni succeeded Millerand (q.v.) as minister of war. The Briand Cabinet was reorganised in Dec. Lyautey became minister of war, but resigned in Mar. 1917. Under a new ministry formed by Ribot, who succeeded Briand, Painlevé was made minister of war. Painlevé continued the Balkan policy of supporting Venizelos. In Sept. the whole Cabinet was reorganised, Painlevé becoming premier. Defeatism at this time was assuming serious proportions, and this brought about the fall of the Painlevé Gov. in Nov. 1917, and

Clemenceau was invited to become premier and minister of war. Energetically he fought defeatism and was soon regarded as a national hero. His authority was almost unquestioned (see CLEMENCEAU). By the treaty of Versailles, 28 June 1919, F. recovered Alsace-Lorraine (q.v.), but failed in the desire to fix the Rhine as the Ger. frontier, although the Rhineland was to be occupied by Fr. and allied troops for 15 years. F. was also given a mandate for Syria, and, in addition, acquired Togoland and part of the Ger. Cameroons (q.v.). With the Fr. realisation that the treaty was giving them neither the security nor the reparations on which they had counted, Clemenceau became unpopular, and in the 1919

gave way to a *bloc des gauches*, with Herriot (q.v.) at its head. Poincaré's retirement rendered Millerand's position as president untenable; he resigned, and was succeeded by Gaston Doumergue (q.v.), who, in 1931, was followed by Doumer (q.v.). Herriot, the new premier, found himself in agreement with MacDonald, prime minister of Britain, and the Entente Cordiale was re-established. At the London Conference, 1924, the Dawes plan (q.v.) was accepted. Fr. evacuation of the Ruhr was completed in 1925. Herriot played a foremost part in the framing of the Geneva protocol at the League of Nations Assembly in Sept. 1924, and although the protocol was not ratified, it led the way to the Locarno



D. McLeish

THE PALACE OF VERSAILLES, SCENE OF THE TREATY OF 28 JUNE 1919

elections he was superseded by Millerand, who formed a Conservative *bloc national*. Moreover, not Clemenceau but Deschanel was elected to the presidency when Poincaré retired in 1920. When Deschanel fell ill, Millerand was elected president. Leygues became premier for a short time, but at the beginning of 1921 he was succeeded by Briand.

The problem before Fr. statesmen was that of the reconstruction of F., and it was hoped to effect this by making Germany pay, as Germany had made F. pay in 1871. Fr. war casualties included nearly 1,400,000 killed, and nearly 450,000 missing. One-tenth of the country had been laid waste. The cost of reconstruction was reckoned at about £250,000,000. At the Paris Conference of 1921 the amount to be paid was reduced to 226,000,000,000 gold marks. By 1922 Germany had defaulted seriously on her payments, and Poincaré, who had succeeded Briand, ordered Fr. troops to occupy the Ruhr. In the elections of 1924 Poincaré was defeated over the financial question. The *bloc national*

fact, which was negotiated during 1925 by Briand, Fr. foreign minister, with Austen Chamberlain and Stresemann.

Although the Herriot ministry brought a new spirit into international affairs, it was forced to resign over the acute financial question. Poincaré then formed a ministry to stabilise the franc. He set up an autonomous fund commission to deal with the floating debt, and in 1926 the budget was balanced for the first time since 1913. The value of the franc was increased by 100 per cent and fluctuations were prevented. In domestic affairs the Poincaré Cabinet withstood repeated attacks from the Radical Socialists, while in foreign affairs the Briand-Kellogg Pact was concluded in Aug. 1928 (see KELLOGG Pact), and the following year Poincaré secured ratification of the Young plan, together with the Churchill-Callaux Accord with England and the Mellon-Béranger Accord with the U.S.A. in respect of the Fr. debts. In July 1929 Poincaré resigned through ill-health, and Briand continued as premier of the Poincaré Cabinet until defeated in Oct.

Briand, however, remained as foreign minister in the new gov. formed by André Tardieu.

Briand next served as foreign minister under Pierre Laval (q.v.), who 9 years later was destined to prove F.'s evil genius. Over the next few years gov. succeeded gov. rapidly. It was a period of political and economic instability and contained a number of events which suggested a general decline in public morality. In 1934, for example, Europe was startled by the Stavisky scandal. The scandal, which involved the flotation by Stavisky, in the name of the municipal credit estab. of Bayonne, of a very large sum in bogus bonds, plainly revealed much political corruption. To restore political stability Doumergue was recalled to office, with Barthou at the Quai d'Orsay. Barthou, however, fell, with Alexander of Yugoslavia, at the hands of a Czech assassin, an event which brought back Laval as foreign minister. But F.'s main preoccupation at this time (1935) was Ger. rearmament in defiance of the Versailles Treaty. At the Stresa Conference the Brit. delegate tried to secure the return of Germany to the League of Nations, but the Fr. representative made that course impossible through striving to enhance his country's security by inducing the League Council to denounce Germany's violation of the treaty; a course that might have been justified had the council followed up its resolution by using the full machinery of the League covenant, even by the use of force, to stop Ger. rearmament. In the result Germany, having rejected the League's resolution and denied its jurisdiction, demanded air parity with F. and full equality of status with other sovereign powers.

F. was now losing the dominating position in Europe which she had held after the First World War—a position she had buttressed by a system of alliances with the E. European states. After the Nazis had seized power in Germany, F. for long abstained from open opposition to Germany's policy of rearmament and expansion, though, prior to Hitler's rise to power, she had successfully opposed an understanding between Germany and Austria, whether in the guise of a trade agreement or otherwise. But, in 1936, internal problems pre-occupied her. The so-called 'front populaire,' formed by Communists, Socialists, and Radicals under the leadership of the Socialist, Léon Blum (q.v.), exactly reflected the mutual class jealousies which stultified Fr. policy in the ensuing years. This gov. carried out a number of urgent social reforms; but, faced with economic difficulties, its influence soon declined, especially when its counterpart in Spain was defeated, partly through lack of any effective help from F. to counteract the aid given to Franco by Germany and Italy. The Popular Front in F. finally disappeared in 1938 when Daladier, supported by a radical and right-wing majority, succeeded Blum. Under Daladier a policy

of appeasement was pursued, Daladier being in Sept. 1938 a party to the Munich agreement which left F.'s ally Czechoslovakia to the mercy of Hitler. After this the position of F. in Europe deteriorated rapidly. Mussolini, emboldened by Fr. weakness, advanced impudent claims to Corsica, Tunis, Nice, Savoy, and Djibouti. But even then few in Britain believed that F. was really the decadent nation which Ger. propagandists described. When, in Sept. 1939, she took up arms with Britain in defence of Poland against Ger. aggression it was popularly believed in Britain that she would display her traditional valour and resourcefulness. But though the Fr. armies offered a brave resistance in the opening stages of the offensive on the W. Front, a total collapse followed late in June 1940. (*See EUROPE, HISTORY; WORLD WAR, SECOND; WESTERN FRONT IN SECOND WORLD WAR.*)

The military collapse of F. came as a thunderbolt to her Brit. ally. Brit. public opinion was still thinking of Fr. arms in terms of the dramatic Fr. resistance on the Marne, the Chemin des Dames, and at Verdun in the previous war. But the probability is that, while the Fr. soldiers of 1940 were in no way inferior to their predecessors, Fr. generalship was, with a few exceptions, extremely feeble. Many of her military leaders seemed to have little conception of the character of a modern war. After the gap had been torn in the Fr. lines at Sedan there was no real attempt at a co-ordinated scheme of resistance.

The causes of this historic tragedy are numerous and have their roots in tendencies operative over many years; and it is impossible to assign to any one or more of these causes the greater weight of responsibility. But apart from the political and social weakness of F. in the period before June 1940, the completeness of the military defeat supplies the essential factor in the tragedy. It is beyond doubt that the nation was divided against itself, that its constitution was defective and that the corruptibility of many prominent Fr. politicians sapped the country's vitality. Yet even the most united and best organised nation could hardly have withstood the tremendous military odds which confronted F. in May 1940. While Germany for at least a decade previously had concentrated on perfecting a modern military machine, combining weight and mobility, for offensive use against the defences that had defeated her in 1918, and on formulating a scientific strategy, F., worn out by the previous war, staked all on the Maginot line. There is a strong element of truth in the charge that the 'Maginot mentality' wrought the ruin of F. The idea of a purely defensive strategy reflected the pacific and war-weary mind of the Fr. people and made it impossible for the Fr. high command to appreciate the change which modern scientific advance had brought about in the art of war. Moreover, even had her general staff been more fully alive to modern military progress, it is doubtful

whether they would have obtained before 1939 the enormous financial credits without which adequate mechanisation of the army could not have been achieved. In this manner F. suffered an annihilating military defeat. Against 60- and 70-ton Ger. tanks and dive-bombers the traditional bravery, *elan*, and resourcefulness of the Fr. soldier were powerless. The mass of the people of Paris had no conception, until too late, of the gravity of the situation, and when the city was raided by some 300 Ger. aeroplanes and the imminent advance on it of the Ger. tanks could no longer be concealed, every road issuing from the metropolis was choked with an unending stream of refugees in cars, carts, and on foot, hampering hopelessly all military activity and leaving in the city only settled despair.

Political and social weaknesses also contributed to the defeat of F.; and the politicians who played their part in her humiliating capitulation did not belong to any single political party. Their variety of origin shows how widespread was the collapse of Fr. morale. Furthermore, it is difficult to avoid the inference that a considerable number of the Fr. bourgeoisie had for many years been undermined by the activities of the 'Fifth Column' (q.v.).

Daladier's administration was followed by that of Reynaud in Mar. 1940. In the May crisis the aged Marshal Pétain (q.v.) and other pro-Fascists were brought into the gov. When Paris fell in mid June Reynaud discussed with the Brit. Gov. the question of a separate armistice, the existence of a Franco-Brit. agreement forbidding such a course. In reply Churchill offered common citizenship between the 2 nations, emphasising that cost what it might Britain would continue the fight. When this offer was refused the Brit. Gov. agreed to consider the release of F. from her obligation provided the Fr. Fleet were prevented from falling into Ger. hands. But the danger of this last contingency was enhanced by the overthrow of Reynaud and his replacement by Pétain as premier. Pétain surrendered unconditionally to Hitler and left the Germans in occupation of the N. part of F. and of the entire coast to the Sp. frontier. The Germans were thus free to use the Fr. coast and its ports as bases against Britain. Churchill, however, acted swiftly against the Fr. Fleet, which was now ready to act under Ger. dictation, and many of its battleships were either brought into Brit. ports, sunk, or damaged, while a number of other warships were put out of action (see NAVAL OPERATIONS IN SECOND WORLD WAR). The immediate consequence of this operation was that the Pétain Gov. broke off relations with Britain, and moving from Bordeaux to Vichy became the puppet of the Ger. Gov., its most influential member being not the aged Pétain but his deputy, Laval (q.v.). A rump Chamber of Deputies voted for the promulgation of a new constitution to be founded on the sombre basis of 'work,

family, fatherland' in place of the Republican 'liberty, equality, fraternity.' President Lebrun resigned, and Pétain assumed the title of chief of state. De Gaulle (q.v.), the one general in F. who had striven to mechanise the Fr. Army, and who had made good his escape to Britain, formed a Fr. National Committee in London to continue the war effort. The Brit. Gov., while continuing its recognition of the Vichy Gov., accorded every assistance to de Gaulle, who, assuming the title leader of all free Frenchmen, began to organise a Fr. Army and Navy in Britain. Soon afterwards Fr. Equatorial Africa and the Chad region transferred their allegiance to him.

Thus perished the Third Fr. Rep. The constitutional laws of 1875, which were the basis of the rep., were formally abrogated in Aug. 1940. Only in the unoccupied zone and the African colonies governed from Vichy did the ghost of the old rep. still linger on. Gradually Hitler separated the nation from the state: Alsace and Lorraine were administered from Berlin as part of the Reich, the 'prohibited zone,' nearest Britain, was governed by the military authorities from Brussels, the rest of occupied F. was governed from Paris. Under Pétain the rep. survived in 2 forms: the chief of state exercised his legislative functions in the council of ministers pending the formation of new assemblies, and both senate and deputies were to remain in being until the new assemblies were formed. But even after their formation the chief of state was empowered 'in the event of tension from abroad or grave internal crisis' to wield legislative power by himself, and he alone could declare a state of siege. In Feb. 1941 a *conseil national* was set up to assist the chief of state in a purely consultative capacity, and its sessions were secret; but the avowed scheme was to create a corporative state somewhat on the It. model. The exigencies of collaboration with Germany and the dislocation of economic life made necessary a high degree of state control of industry. Organised resistance to Vichy soon became apparent. In Aug. 1941 Pétain banned all political parties, all public or private political meetings. After the collapse of 1940, many Frenchmen believed that Pétain's actions had at least saved them from a worse fate; for at that time public opinion considered a total allied defeat only a matter of weeks. But subsequent events—the Battle of Britain, and the Russian resistance to Ger. invasion—coupled with a growing realisation that Pétain's regime was nothing but a Ger. puppet state, soon brought a change of attitude. Founded on the assumption of total defeat and the death of Fr. national consciousness, the Vichy Gov. at the end of 1941 found that defeat was not certain, and that the national consciousness was reawakening, and having equipped F. with all the machinery of a Fascist regime it now failed to find the support to drive the machine.

The re-emergence of the traditional spirit of F. was dramatically reflected by the scuttling of the Fr. Fleet at Toulon (27 Nov. 1943) soon after the allied landing in Fr. North Africa. This act was the climax of increasing Ger. pressure and spoliation. Laval had returned to office in 1943 as 'head of the Government with special powers,' superseding Darlan (q.v.), who was appointed commander of all the forces. To all intents and purposes Laval was now Hitler's agent. Assuming dictatorial powers, albeit under Ger. patronage, he undertook to hand over skilled Fr. labour to Ger. war factories against the release of a small number of Fr. prisoners-of-war. Laval destroyed the last vestiges of the parl. system, by abolishing the offices of president of the Senate and the Chamber. But throughout these violations of Fr. liberties, sabotage and the killing of Ger. soldiers continued, notwithstanding the penalties which followed, and scores of hostages faced the Ger. firing squads. It was in the same defiant spirit that the Fr. Fleet sacrificed itself at Toulon. When the Anglo-Amer. forces landed in Fr. North Africa, the Germans at once overran Vichy F. Hitler, to gain time, designated Toulon a special area which Ger. troops were not to enter. His real intentions were shown on 27 Nov., when the Germans began to march in. The many warships were then either scuttled or damaged—an act of immolation which restored Fr. honour and reasserted Fr. sovereignty. Under an arrangement with Eisenhower (q.v.) Darlan assumed responsibility for the civil administration in North Africa as a temporary measure. On Christmas Eve, however, Darlan was assassinated in Algiers and Giraud (q.v.), who had opposed compromise with the Germans, was appointed his successor. The stand which de Gaulle and his colleagues had sustained since the days of capitulation in June 1940 assumed a wider and more corporate form after the landings in North Africa; and through the efforts of Catroux an agreement was reached between de Gaulle and Giraud in June 1943 for the setting up of a Fr. Committee of National Liberation to direct the Fr. share in the campaign of reconquest, and also of a consultative assembly in Algiers and a unified administration for the Fr. Empire, soon wholly in the war on the allied side except for Indo-China, the possession of which Vichy had allowed to pass to Japan. De Gaulle and Giraud shared the co-presidency of the committee for a time, but soon Giraud devoted himself to the duties of commander-in-chief of the Fr. forces; these now included the Fr. fleet at Alexandria, which had joined the Allies on 31 May 1942 after having been neutralised since 1940. Notwithstanding savage repression by the occupying Germans, and the apathy of Vichy, resistance inside F. grew. Wreckings increased, Germans were shot, and traitors struck down. A remarkable enterprise was launched when thousands of young men,

scheduled for deportation to Germany under an arrangement between Laval and Sauckel, Hitler's director of man-power, took to the *maquis* and maintained a sacrificial fight for freedom.

On 19 Mar. 1943 Gen. Catroux, the Fr. delegate general in Syria, proclaimed the restoration of the free constitution of the Lebanon; but soon afterwards a crisis arose over conflicting views on the continuing validity of the Fr. mandate, and the dispute was only settled at the end of the year. Both this incident and the equivocal attitude of the assembly in Algiers reflected the indisputable fact that at this time the Allies were still paying the costs of the comparative success of Ger. policy in F. The gov. of Vichy, if always feeble, did represent a Ger. success, however limited. For the creation in F. of a gov. which professed to accept Ger. leadership in Europe, and which professed to be able to protect Fr. interests outside Europe by its own diplomacy and its own arms, was a real success. It confused the issue inside F., inside Europe and over a great part of the world, notably in the U.S.A., and for a time the national committee and the assembly did not claim to be a sovereign gov., and were, in fact, not recognised as a gov. at all. It was soon evident, however, that the Fr. national committee and the assembly were the spokesmen of a highly organised revolutionary movement, the resistance movement, and the Allies' recognition of the international status of the committee was therefore ultimately inevitable.

The following year (1944) saw the liberation of F. through the invasion by the Anglo-Amer. forces under Eisenhower, which were landed in Normandy on 6 June. By early Sept. these and other allied forces landed in the S. had overrun most of F. and expelled the Ger. Armies (see WESTERN FRONT IN SECOND WORLD WAR). When in Dec. de Gaulle went to Moscow to sign a treaty of alliance and mutual assistance with Stalin he not showed how far F. had advanced towards re-establishing herself as a great power. But the path had not been an easy one; and even up to the moment of the allied assault in Normandy Amer. and Brit. recognition of the Fr. Committee of National Liberation was still withheld. With the Allies firmly estab. in Normandy it was at once apparent that the authority of Vichy was not acknowledged by any large section of the nation. On the other hand, the resistance movement emerged as a vigorous fighting force commanding popular support. The movement was recognised by the allied supreme command as a regular combatant army and named the Fr. Forces of the Interior, and it co-operated with considerable effectiveness in the allied campaign in Normandy. The Fr. people gave de Gaulle a fervent welcome, and in Paris, where he was popularly acclaimed, he took firm control of affairs, and Lebrun, president at the time of the armistice, formally resigned. On 23 Oct. 1944 Great Britain, the U.S.A., and Russia recognised de Gaulle's

administration as the Provisional Gov. of the rep. At the same time the greater part of F. was declared no longer a combat zone and was transferred to Fr. authority. The leaders of the Vichy regime disappeared into Germany or into hiding. As the Germans and their Fr. collaborators saw their power ending in F. terrorism was intensified, and in 4 months, from June to Oct., scores of men, women, and children were massacred (see ORADOUR-SUR-GLANE).

Paris was physically undamaged in the war, but, on the other hand, no Eng. city,

Fr. rule altogether. In Indo-China the Communists soon launched a full-scale war against F. (For fuller details see articles on the countries concerned.) Those colonial problems were to drain F.'s economy severely in the post-war years, and had considerable repercussions on internal Fr. politics.

A Constituent Assembly charged with the duty of drawing up a constitution for the Fourth Rep. was elected in the following year (1945) (women voting in F. for the first time). The Communists were returned as the strongest party,



'New York Times' Photos

THE LIBERATION OF PARIS: 25 AUGUST 1944

with the possible exception of Coventry, was smashed like Brest, Rouen, Lorient, Havre, and Caen. The Fr. had suffered considerable economic privations during the years 1940-4; and Paris in 1944 was in the midst of an inflation which was threatening the liquidation of the middle class. The Communists were the largest single political force. It was obvious that the political and economic hist. of the next few years was to be of vital importance to the future of Fr. democracy. F.'s internal problems were not her only ones. The pre-1939 Fr. colonial empire no longer existed. Syria and the Lebanon had already achieved independence; the Fr. West African possessions were demanding at least a measure of self-gov., and extreme nationalists in Fr. West Africa were calling for independence from

closely followed by the Socialists and a new political organisation known as the Mouvement Républicain Populaire (M.R.P.). This last party drew its main driving force from the men and women who were in the resistance, and from Catholics who favoured large social and economic changes in the State; but it also derived support from the older parties of the right, which saw no political future in isolation. The prestige of the M.R.P. was enhanced too by its close association with de Gaulle himself. When the Constituent Assembly met, de Gaulle returned to the people the powers he had exercised and, having been given a new mandate, formed a gov. drawn from the 3 main parties and pledged to a far-reaching social programme.

De Gaulle resigned in Jan. of the

following year (1946). His provisional gov. had denounced the constitution of 1940, and restored the Third Rep. and its constitution, as in force in 1939. This *modus vivendi*, however, did not reflect the views of the majority of the people of F., and throughout 1946 F. was searching for a new constitution. The reconciliation of a sovereign legislature with a stable executive was the stumbling block, though the seriousness of the country's financial position clearly pointed to the need for a strong gov. A first Constituent Assembly entrusted the task of devising a draft constitution to a representative committee, which produced proposals reflecting advanced democratic thought. Though this draft was approved by a majority of the assembly it was rejected on a referendum (May). A second assembly was elected whose revised draft modified the more stringent provisions of the first draft. Under this constitution, which was approved in a referendum in Oct., a second chamber, the Council of the Rep., with members chosen by indirect election, was given a voice, though not a decisive one, in the legislation; while the president was to be elected by the 2 Houses in joint session. There were also provisions for revision of the constitution by adequate majorities, for the possible dissolution of the assembly, and for the political organisation of the Fr. Union—the new term for F.'s depleted colonial empire.

In the Nov. 1946 elections, which created the first National Assembly of the new Fourth Rep., the Socialists fell to the third place among the 3 leading parties. The Communists were still the strongest single party, but the majority in the assembly was strongly anti-Communist. Paradoxically, when the Socialists dropped from second to third place they strengthened their tactical position; for in the new conditions of equipoise between Communists and the M.R.P. they secured the vital position in the middle of the political see-saw, and it was in these circumstances that in Dec. Blum formed a purely Socialist gov. His stop-gap gov. launched a decisive attack on the price rises and on financial instability; sent out Moutet to attempt final settlement of the Indo-Chinese problem; went far to reach agreement with Great Britain on the settlement of W. Europe, Blum coming himself to London; and, above all, laid the foundations of a new Anglo-Fr. entente. On 16 Jan. 1947, despite popular indifference to the choice of the first president of the new rep., the assembly installed in office the Socialist Vincent Auriol (q.v.), a close friend and colleague of Blum and author of *Hier Demain*, 1945, which expressed similar political views to those of Blum himself.

Blum resigned for reasons of health and was succeeded by Ramadier (also Socialist). The change of gov., however, did not interfere with the negotiations for a treaty of alliance with the U.K., and the treaty was eventually signed at Dunkirk (4 Mar.). Ramadier's gov. was a coalition. The main features

of the first 4 months of the year were the formation of the *Rassemblement du Peuple Français* (R.P.F., Rally of the Fr. People), the deterioration of the economic situation, and the deepening div. in the gov. between the Communists and the rest of the ministers. The R.P.F. was an organisation fostered by Gen. de Gaulle as a nation-wide movement of national union, and though he was accused by the left, especially the Communists, of favouring the reactionary or Fascist elements, the movement constituted a new and popular force which for a time materially affected the political balance in F., achieving a sweeping victory in the municipal elections. But meanwhile the economic situation was growing steadily worse. The political situation was further weakened by the refusal of the Communists to vote the military credits required for operations against the rebels in Indo-China and to suppress a revolt in Madagascar. The Communists then left the gov. A series of strikes throughout the year threatened to paralyse the national economy and seemed to threaten at times the very structure of the rep. There were sev. gov. crises; and at the end of the year Ramadier was succeeded by Schuman (q.v.) as premier. Drastic measures were initiated in an attempt to halt the inflationary spiral. There were 3 changes of gov. between Jan. and Sept. in the ensuing year (1948), showing that the country was more sharply divided than ever between Communists and non-Communists and that the 'Third Force' evoked by the Socialists and the M.R.P. had ceased to exist as an effective political factor, despite its majority within Parliament. This weakness of Parliament made the search for social and economic stability increasingly difficult.

In Sept. a coalition under the Radical Socialist Queuille (q.v.) took office, and a period of relative political stability followed. There were further serious strikes; but Communist threats to public order were suppressed by calling in troops. Meanwhile, de Gaulle emerged as an open challenger to the republican regime in its existing form. In Nov. his party was highly successful in elections to the second chamber, the *Conseil de la République*. By this time, events abroad were overshadowed by the widespread popular fear in F. that W. Germany might appear once more as a dominant member of the European community, a situation the majority of Frenchmen were anxious to prevent however illogical their opposition to it might be. Fear of Germany after 2 world wars had become a major influence in Fr. political life. In 1949 F. joined the North Atlantic Treaty Organisation (q.v.).

In July 1949 Queuille's gov. fell. There was a series of rapid changes of gov. before political stability returned with Bidault (q.v.) as premier. By early 1950 the Indo-China situation was becoming extremely serious. De Latre de Tassigny (q.v.) was appointed commander-in-chief

of the Fr. Army and Fr. high commissioner there in an attempt to retrieve the situation; his subsequent premature death probably put the seal on certain Fr. defeat in the area. Public opinion was much exercised over Indo-China, and also over the Saar problem. F. still hoped for an autonomous Saar, linked economically to herself, a hope based on the strong Fr. fear of the rebirth of a powerful Germany. In May 1950 the Fr. foreign minister put forward his 'Schuman plan' which eventually developed into the European Coal and Steel Community (q.v.). The

the Indo-China crisis and the pressing question of a European army including W. Ger. forces, which involved, of course, the re-creation of a Ger. army, regarded by many Frenchmen as synonymous with the re-creation of Ger. 'militarism.' Plevien became premier in Aug. 1951, and was succeeded at the beginning of 1952 by Faure (q.v.), a Radical-Socialist.

Faure reopened the Tunis question, but his gov. lasted only a few weeks, and in Mar. 1952 Pinay succeeded him. Popular agitation against the European Defence Community (q.v.) was by this time



D. McLeish

THE HOSPICE OF GREAT ST BERNARD

The district of Savoy in which the hospice stands was ceded to France by Italy in 1947.

Fr. president paid a state visit to London in Mar. 1950 and was enthusiastically received.

In spite of a number of short-lived govts. the period 1950-1 marked an improvement in F.'s internal affairs, her economic position becoming much stronger. In Indo-China the Fr. position worsened. Queuille was again premier in Feb. 1951 and in April 1951 a programme of electoral reform was carried through the Assembly. In the general elections in June 1951, the Communists lost seats but still remained strong. But the Gaullists were the strongest party in the Assembly.

Many observers believed that de Gaulle's return to power was imminent. The economic situation was weakening again: a bitter domestic battle was raging on the question of state aid to confessional schools; abroad, there was

intense in F., the Communists and Gaullists being especially vocal in their opposition to it. In May the arrival in Paris of Gen. Ridgway (q.v.), supreme allied commander in Europe, was the occasion for serious Communist rioting. In July the Gaullists split on a question of party discipline, and after this time de Gaulle's prospects of a return to power receded rapidly. The split helped Pinay, who now had the support of the dissident Gaullists, but in Dec. 1952 he was defeated on a domestic issue and resigned. Soustelle, the Gaullist leader in the Assembly, failed to form a gov., and eventually, early in 1953, Mayer became premier.

The anti-E.D.C. campaign in 1953 increased, causing some deterioration in relations between F. and Federal Germany. In April the Gaullists lost

heavily in the municipal elections, and in May de Gaulle resigned from the leadership of the R.P.F. Meanwhile an acute political crisis had arisen. After a prolonged period without a gov. Laniel became premier in June 1953. His gov. pursued a strong policy at home and abroad. At home, the economic restrictions imposed in an effort to control the inflationary situation caused a wave of strikes. Abroad, the sultan of Morocco was deposed and a pro-Fr. sultan put in his place. In Oct. 1953 the Assembly voted in favour of continuing the Indo-China war. The Fr. position there was rapidly becoming untenable; nevertheless, the fall of Dien Bien Phu in May 1954 shocked Fr. public opinion deeply, and the following month the gov. was defeated on an Indo-China issue.

The new premier was the Radical-Socialist Pierre Mendès-France (q.v.). He faced serious problems in Indo-China and North Africa, and tackled these with a realist radicalism which created a sensation both in F. and elsewhere. In July the fighting in Indo-China was ended by agreement reached at Geneva. This really marked the end of 80 years of Fr. rule in Indo-China and was generally regarded in F. as a crushing surrender; the Fr. occupation of Indo-China came formally to an end on 29 April 1955. Mendès-France's North African policy eventually led to his defeat in the Assembly in Feb. 1955, and he was succeeded by Faure. Before this, however, F. had rejected E.D.C. (Aug. 1954), but the London-Paris agreements of Oct.-Nov. which followed its rejection laid the foundations of Western Union and ensured a Ger. contribution to a European defence force, with safeguards against possible future Ger. aggression which were considered satisfactory to F.

Faure's premiership was marked by considerable advances towards a solution in North Africa, as well as by the signing of the Austrian Peace Treaty (May 1955). The Franco-Tunisian Home Rule agreements were signed in Paris in June; in Oct. the former Moroccan sultan, deposed by the Fr. 2 years earlier, was restored to his throne. But by this time the situation in Algeria was becoming menacing too, and at home political stability and possibly the Fourth Rep. itself were temporarily threatened by the rise of a violently right-wing movement under Poujade; but its popularity was only transient. The Saar referendum in Oct., with its overwhelming victory for the pro-Ger. parties, was another blow to F. In Nov. Faure's gov. was defeated on a question of electoral reform. Faure decided on a dissolution, and was thereupon expelled from his party. The general elections of Jan. 1956 produced an indecisive result: in Feb. Mollet (q.v.) became premier. Though governing with a precariously-balanced coalition, he was premier longer than any previous holder of the office under the Fourth Rep.

Moroccan independence was announced in Mar. 1956; but the Algerian situation

was now tantamount to civil war and was causing severe economic and political stresses in F. Throughout 1956 unsuccessful efforts were made to reach a solution there, but it became increasingly evident that the Algerian leaders demanded considerably more than F. was prepared to give them.

In July 1956 Egypt nationalised the Suez Canal. Fr. concern was considerable, and there were high-level



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H.M. QUERN ELIZABETH AT THE OPERA
DURING THE STATE VISIT TO PARIS,
1957

Anglo-Fr. talks in early Oct. Following the outbreak of fighting between Israel and Egypt later in the month came the Anglo-Fr. ultimatum to both sides, stipulating that fighting must stop. Egypt rejected this, and, after sev. days' bombing of Egyptian military objectives, Anglo-Fr. troops landed at Port Said. Subsequently, Britain and F. complied with the U.N. directive and withdrew their forces from Egypt; but Fr. public opinion was more wholeheartedly in favour of armed intervention in Suez and more critical of the withdrawal than that in Britain. (See further under UNITED NATIONS ORGANISATION; EGYPT; SUEZ CANAL.)

The Suez affair demonstrated the close relations existing between F. and Britain: and Anglo-Fr. friendship was convincingly demonstrated in the fervent welcome which Queen Elizabeth II received on her state visit to Paris in April 1957.

Meanwhile, a deteriorating economic situation threatened the Mollet gov.'s survival, and the Algerian position remained extremely critical. In May 1957 Mollet was defeated on a vote of confidence. He was succeeded in June by Bourges-Maunoury (q.v.), who was defeated in Oct. on the Algerian issue. He was in turn succeeded by Gaillard (q.v.). It could be said in 1958 that the Fourth Rep., despite its frequent gov. changes and obvious structural defects, had weathered 12 years of considerable political and economic stress with surprising success, and had withstood serious threats to a continuance of democracy from both left- and right-wing opponents.

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France, Ile de, see MAURITIUS.

France and Flanders, First World War Campaign in. 1914. *German Invasion of Belgium.*—Preparations for a war between France and Germany had been actively made for many years before the actual outbreak in 1914. Germany's plan provided for a swift defeat of France which would enable her to transfer an adequate number of troops to her E. front and overwhelm Russia whilst that country was still in process of mobilisation. The destruction of the Fr. forces was to be accomplished by the envelopment of their left flank and, as this would probably require the passage of a large force through

Belgium, the violation of that country's neutrality (of which Germany herself was one of the guarantors) was duly provided for in Germany's plan. Such were the military factors which operated to make F. and E. the W. front during the First World War.

Germany declared war on France on 3 Aug. 1914, and it being early evident that the Germans would violate Belgian neutrality, the Belgian Army was deployed to resist the invasion. On 4 Aug. Ger. troops crossed the border into Belgium and commenced an attack on the fortresses of Liège. This violation caused Great Britain to declare war on Germany, and the Brit. mobilisation was ordered at once. Gen. von Emmich (q.v.) was in command of the Ger. invading force, the Belgians being under the command of Gen. Leman. The Germans could make little progress against the Belgians until they brought up their heavy howitzers. These quickly pounded the fortifications, which were unprepared for projectiles of such weight (see FORTIFICATIONS). This delay gave Great Britain time to transport her army to France and take up its position on the left of the Fr. line near Mons. By the 3rd week in Aug. the Ger. Armies had overcome the Belgian obstruction and, pouring through unopposed, were threatening the Fr. left. Whilst the operations in Belgium were in progress the Fr. and Ger. Armies had deployed, facing each other along the frontier. As a set-off against the Ger. advance on his left wing, Marshal Joffre (q.v.), the Fr. commander-in-chief, tried on 20 Aug. to penetrate the Ger. line on his right flank, about Sarrebourg and Morhange. The Fr. were defeated with heavy loss and driven back to the frontier. About the same time the Fifth Fr. Army, under Lanrezac, also sustained defeat at the hands of von Bülow (q.v.), commanding the Second Ger. Army at Charleroi.

Von Kluck's Enveloping Manoeuvre.—With Metz as the pivot, the whole of the Ger. right wing was now making a great sweeping movement to envelop the Fr. left. As soon as Belgian opposition had been disposed of, the First Ger. Army, under von Kluck (q.v.), advanced rapidly and, by 23 Aug., was in a position which imposed a hasty retreat on the allied left wing to enable it to escape attack by overwhelming odds. At this time, however, thanks to the Allies' counter-espionage service, von Kluck was unaware that the Brit. expeditionary force (B.E.F., q.v.), under the command of Gen. Sir John French, was in position on the Fr. left; nor was this fact known at Ger. G.H.Q. The B.E.F. was actually in the perilous position of having both its flanks exposed to an overwhelming adversary; but notwithstanding these difficulties the Brit. 2nd Corps, under Gen. Sir Horace Smith-Dorrien, faced the Germans at Le Cateau (q.v.) on 26 Aug. and not only held up von Kluck's victorious march, but also inflicted great loss on the Germans. A few days later Lanrezac checked von Kluck at Guise, but the vast superiority

in numbers of the Germans compelled the B.E.F. and Lanrezac's Fifth Army to retreat rapidly to avoid annihilation—a movement which exposed Joffre's left wing to attack. In order to avert this threat, Joffre threw back the whole of his line from Nancy to the left, and created a new army under Gen. Maunoury on the extreme left about Paris.

One of the decisive features of the war occurred when von Kluck's right flank reached the R. Somme about Amiens. Being under the impression that the B.E.F. had been annihilated, and in ignorance of Maunoury's new army about Paris, he changed his direction from practically SW. to S., in order to envelop the Fr. left wing. When he arrived at the R. Oise he again changed to SE., thereby leaving Paris some m. away on his right flank, which was exposed to attack by Maunoury and the troops of the Paris defences. As the envelopment of the Fr. left was now regarded as a certainty, the Germans endeavoured to 'roll up' the right flank also and thus complete the destruction of the entire Fr. Army. To this end Prince Rupprecht tried to break through at Nancy but was heavily repulsed.

Battle of the Marne.—During the preceding few days Joffre had also formed another army under Foch, also towards his left flank, to fill up the gap in the retreating Fr. Armies. Joffre now waited until von Kluck had crossed the R. Marne, and then gave the famous order for a counter-offensive to begin on 6 Sep. Maunoury attacked von Kluck on his flank and rear, and forced him to recross the Marne precipitately and to face W. to meet this unexpected assailant. Foch held up von Bülow and Hansen. On 8 Sept. the B.E.F. pressed forward towards the Marne (see MARNE, BATTLE OF THE) in the gap between von Kluck and von Bülow, compelling the latter to retreat towards the Aisne. Von Kluck was ordered to conform to Bülow's movements, for otherwise he would have been completely isolated. This retreat was the deathblow to Ger. hopes of enveloping the Fr. Armies.

During these early movements in the First World War the direction of the Ger. armies was under Gen. von Moltke, chief of the general staff; but he was now removed from his appointment and succeeded by Gen. von Falkenhayn (q.v.).

Although the Ger. invasion had been arrested, and their right wing forced back, on the remainder of the front their line seemed immovable. The Belgian Army was still holding out at Antwerp (q.v.), to which it had withdrawn after the fall of Liège, and being in rear of the Ger. right, was, although small, a force to be reckoned with as calculated to interfere with the Ger. communications. It therefore forced the Germans to detach a force sufficient to guard against any offensive action it might be capable of taking. During its occupation of Antwerp the Belgian Army was reinforced by Brit. naval and royal marine brigades. The ten

tell on 9 Oct.; the Brit. garrison reached Ostend, where it embarked for England, and the remnant of the Belgian Army escaped along the coast and eventually joined some Fr. marines holding the Yser at Nieuport.

The Race to the Sea. First Battle of Ypres.—The Germans having been pushed back on his left, Joffre now intended to carry his counter-offensive round their opposite flank, but the Germans countered this by bringing up reserves which completed the line to the sea. They also planned a 'break-through' in N. France in order to gain the Channel ports (q.v.), which would provide submarine and aircraft bases within easy striking distance of

miniscent of the Crimean war. During the winter of 1914-15 both sides were occupied in repairing their losses and preparing for the ensuing spring campaign. In Great Britain Lord Kitchener had become secretary of state for war, and had begun forming the new armies, the first of which he intended for dispatch to France by the spring of 1915. The W. front was therefore comparatively quiet after the first battle of Ypres.

British Attack at Neuve Chapelle.—*Poison Gas Used.*—The successes gained by the Russians on their S. front against Austria caused Germany to transfer troops from the W. to the E. front, and this circumstance led Joffre to decide to



THE MENIN GATE

The gate erected in 1927 as a memorial to British soldiers killed in the Ypres salient during the campaigns in Flanders. It replaced the old gate reduced to ruins by German artillery

England. The Allies' line in this region was also strengthened, while offensive operations to test the strength of their opponents were maintained by both sides until 9 Oct., when the Germans began the first battle of Ypres. This battle continued until 31 Oct., when the Germans made a supreme effort to break through at Gheluvelt. Here the allied line was strung out to breaking point, but the situation was saved by the Worcestershire Regiment, who filled a gap made by the Germans and drove them back with great bravery. Although these operations, culminating in the first Ypres battle, virtually destroyed the *élite* of the Ger. Army, they also saw the end of the original B.E.F., the world-famed 'Conquering Little Army.'

1915. *Trench Warfare.*—Up to this point the campaign had been conducted on the lines of open warfare or war of movement; but thenceforward it resolved itself into trench warfare, somewhat re-

attack the enemy in Artois (q.v.). Sir John French launched an attack against Neuve Chapelle between 10 and 13 Mar. 1915, but achieved little. A month later an Anglo-Fr. attack was made about Ypres, in which the Germans sprung a surprise by using poison gas for the first time.

Second Battle of Ypres.—Foch was in charge of the allied operations in this region, and another offensive was commenced on 22 April, lasting until 25 May (known as the second battle of Ypres), but it failed to achieve any other result than to inflict enormous casualties on the Brit. forces. The allied spring offensive proper or general offensive commenced on 9 May with the Brit. attack on the Aubers ridge. Here the Ger. defences were very formidable and no progress was made. Further S. the Brit. had also commenced the battle of Festubert (q.v.), and although the main objectives were gained, further allied action was held up

by a shortage of shells, a circumstance which directly led to a political crisis in Great Britain and to the formation of a ministry of munitions. In the autumn further attacks were undertaken for political reasons in Artois, Champagne, and about Loos.

The Battle of Loos.—The mining centre of Lens was the final objective of the Loos operations, the main attack of which was along a 7-m. front about La Bassée. It opened on 25 Sept., following an artillery bombardment and a discharge by the Brit. of asphyxiating gas. One of the most violent operations was that connected with the capture of the famous Hohenzollern redoubt, situated just SW. of La Bassée. The final result of the battle was that the allied line was advanced to the E. of Loos, thence N. to just W. of Hulloch. The Fr. attack in the Champagne (q.v.) was launched on 25 Sept.; the Ger. positions were penetrated on a front of about 20 m. between Auberive and Ville-sur-Tourbe. Fighting in this region continued until the end of Nov. These gains in ground, however, were not commensurate with the great losses in men, the Brit. casualties alone, in the battle of Loos, being 50,000. One of the chief reasons why the Allies obtained no decisive result in this fighting was the lack of available reserves at the critical moment. The year 1915 was throughout a black one for the Brit. forces, who suffered over 280,000 casualties.

Sir John French Superseded.—In Dec. Sir John French, who had fulfilled his difficult command with no little ability, resigned his appointment, the military authorities being dissatisfied with the progress made, and he was succeeded as commander-in-chief by Gen. Sir Douglas Haig (see HAIG, EARL). The magnitude of Sir John French's task was, however, enhanced by inadequacy of munitions, the lack of guns of heavy calibre, and the disparity between the numbers of his troops and of those opposed to him. During his command the Fr. military authorities had been responsible for the formulation of plans for the prosecution of the war on the W. front, the Brit. commander conforming thereto, and this system was maintained on the change of command.

Results of 1915 Campaign.—Generally speaking the Germans were on the defensive during 1915, so that in the matter of defensive works they were considerably ahead of the Allies at the beginning of 1916. The provision of labour for unskilled work in and behind the lines was also an important factor; for, whereas the Germans could call on the Belgians and inhab. of the occupied Fr. ter. to do forced labour in connection with their defences, the Allies employed exclusively military labour, so that their combatant ranks were to a great extent depleted on that account.

In Dec. an inter-allied conference, presided over by Joffre, passed a resolution to the effect that a decision could be

obtained only on those fronts where the greatest number of enemy troops was employed, a resolution inspired by the disastrous termination of the Gallipoli campaign (q.v.). The W. front was naturally one of these, and plans were accordingly made for an allied offensive on the Somme as soon as the new Brit. Armies (composed of 'service' or Kitchener battalions) were ready to take their place in the line.

1916. Battle of Verdun.—The first operation of consequence in 1916 was the battle of Verdun (q.v.). Von Falkenhayn, giving the reasons for the Ger. attack on this famous fort, states (see his memoirs) that in the first place it was hoped to deal an effective blow against Britain's chief ally, and secondly to improve the Ger. strategical position in this area. His opinion was that, as Verdun was situated at the angle of the Fr. NE. and E. frontiers, and was less than 12 m. from the Ger. communications, it formed a powerful *point d'appui* for any action of the Allies against those communications, which if broken would render untenable the whole Ger. front in France and Belgium. Another important consideration was that such an attack would forestall the Allies' projected attack on the Somme. Twenty-five divs. were employed by the Germans, but even this colossal force proved insufficient to carry the forts. The Allies had early intimation of the intended move. The imminence of a Ger. attack at Verdun became apparent in the middle of Jan., and Gen. Herr, the Fr. local commander, reported that he considered the defences to be inadequate to withstand the strain. Gen. de Castelnau (q.v.) (chief of the staff) immediately went to Verdun to make a personal reconnaissance, and gave orders for certain works to be carried out which would strengthen the defensive area. There was not time, however, for these orders to be completed before the Germans launched the attack. This was at 6 p.m. on 21 Feb., and on that day they gained Haumont wood and on the 23rd the whole of the first position was in their hands. On the 25th the Germans occupied Fort Douaumont (q.v.), which the Fr. had failed adequately to garrison in spite of the importance which Joffre attached to it. Gen. Pétain was then placed in command of the operations at Verdun, with 12 divs. at his disposal. The first Ger. attack on the l. b. of the Meuse began on 6 Mar., and although operations were continuous for nearly a fortnight they made but little progress. On the r. b. the Germans were making desperate efforts to capture Fort Vaux to facilitate their general attack on the second line of defence; but in spite of the employment of unprecedented artillery bombardments and the use of liquid flame (*Flammenwerfer*) they failed to take the fort. In April Gen. Nivelle assumed command of the Fr. troops on the r. b., and the spirit of the offensive now imbued the Fr. A month later Nivelle was promoted to the chief command of the army of Verdun.

Exasperated by recent reverses at the hands of Berthelot and Mangin (q.v.) the Germans increased their efforts to secure victory on the l. b., but made no appreciable progress after practically a whole month's fighting.

The imminence of the Allies' Somme offensive was now beginning to weigh with the Ger. high command, and the offensive against Verdun was intensified. The first week in June saw vigorous attacks launched against Fort Vaux, which resulted in its capture on the 7th. Another great Ger. onslaught commenced on 23 June, and although active operations were maintained until 8 Aug little advantage was gained. On 29 Aug. von Hindenburg succeeded von Falkenhayn as chief of the Ger. general staff, and he ordered all offensive operations at Verdun to cease. On the Fr. side, however, Gen. Mangin had been largely responsible for the recent Fr. gains on the r. b. of the Meuse, and he at once planned the recapture of the lost forts. Operations were begun in Oct., and by the end of the year nearly all the lost ground had been regained. Verdun had an important bearing on the campaign; it was a great victory for the Fr. and a correspondingly disastrous defeat for Germany, whose armies could not repair the enormous losses sustained, in the abortive attacks, from the fire of the celebrated Fr. 75-mm. guns and mitrailleuses.

The First Battle of the Somme.—The year 1916 also saw the great battle of the Somme (or first battle of the Somme) (see also SOMME BATTLES) which had as serious consequences for the Germans as those of the Verdun battle. As previously stated, this Somme offensive had been decided on at the end of 1915, but it could not be launched until the Brit. forces had been adequately reinforced. The object of the offensive was to obtain a military decision at one colossal blow. The offensive failed of its purpose; yet it effected much in exhausting the Ger. military resources. In addition to wearing down the Germans, it was necessary to arrest their progress at Verdun, and this could only be achieved by compelling them to transfer their reserves to some other and dangerously threatened point. But it would be erroneous to regard the Somme battle as a mere large-scale 'sympathetic' action; it was projected before the battle of Verdun, and without relation to the threat in that quarter: it was indeed hoped to secure by this sustained and co-ordinated advance on a 30-m. front a result which should have really decisive consequences. The relief of the situation at Verdun was a secondary and later consideration. The battle of the Somme saw 2 important innovations: (1) the invention of the 'creeping barrage' (see also BARRAGE) of artillery fire by Gen. Horne; and (2) the employment of tanks (q.v.). The work of the allied air forces was of the greatest importance in this battle, in destroying enemy aircraft and in taking photographs of enemy positions.

The tactical objective of the Allies was

the ridge N. of the Somme, extending through Thiepval, Pozieres, Bazentin-le-Petit and Morval, beyond the Ger. line, for this ridge dominated the country towards Bapaume, and from it the allied artillery could command an extensive area. The general plan was to administer a succession of hammer-blows, alternately Brit. and Fr., in order to distract the enemy, so that he might not know at what point to expect an attempt to pierce the line. The battle was carried out in 3 main phases. The first phase commenced on 1 July, with an attack by the Brit. Fourth Army, under Gen. Rawlinson, between the Somme on the right and Gommecourt on the left. Although the attack was preceded by a very heavy artillery bombardment, some of the Ger. defences were subsequently found to be still intact and many proved fully equal to the extraordinary pressure to which they had been subjected. On the left of the line attacked (i.e. from the Ancre to Gommecourt) the Allies made very little progress; but between the Ancre and the Somme, where the Ger. artillery were in less strength, a definite hold on the enemy positions was obtained in many places. The fighting on both sides was extremely fierce. The difficulties of supply, transport, communications, and evacuation of casualties were increased for the Allies the further they advanced, because, although their artillery fire had done its work effectively, it had at the same time destroyed the roads and other routes. After 3 days' fighting a 16-m. breach was made in the Ger. line, such places as Montauban, Mametz, Fricourt, and La Boisselle falling into Brit. hands. On 7 July the Leipzig redoubt was captured, and 4 days later Contalmaison and Trônes wood fell. The attack was renewed on the Bazentin-le-Petit and Longueval front a few days later: then on 16 July Ovillers was captured and the Australians stormed Pozieres on the 23rd. A few days afterwards Delville wood (q.v.) was captured, and on the 27th, after a tremendous effort and at great sacrifice on both sides, the first phase was concluded with the capture of Longueval. The Allies had broken through the first and second Ger. defensive systems, and between the Ancre and the Somme the allied line formed a great salient to the NE.

The second phase began with an advance by the Fr. on the Somme coupled with determined efforts by the Brit. to improve their tactical position near the Ancre, about Thiepval and Pozieres. The strenuous resistance of the Germans had stopped the advance at this point, thus making a sharp angle in the Brit. line and also preventing the use of the Albert-Bapaume road. Moreover, guns at this point could enfilade the new Brit. line about Bazentin and Longueval, so that a rectification here was essential to any advance further E. The highest point of the ridge had not yet been reached, so that visibility from the ground was still restricted, and although the Allies had gained the supremacy of the air in this

region, security could not be assured until the ridge was wholly in their possession. A general advance was made by Brit. troops from Guillemont to Thiepval on 18 Aug. The fighting was desperate, particularly round Guillemont, which did not fall until 8 Sept. On the left of the line the Germans tenaciously defended Thiepval, and many heavy counter-attacks were launched in their anxiety to hold this position at all costs. Ginchy was also the scene of much bloodshed, but eventually, the Brit. advance prevailed, and the place was captured on 9 Sept. Being now in possession of Guillemont, Ginchy, Delville wood, and Longueval, the Allies were on an equality with the Germans from the standpoint of visibility and in a position to command Comblès on their right and enemy positions about the Albert-Bapaume road on their left. The Fr. had, in the meantime, gained Cléry and Le Forest. The Ger. resistance, however, N. of the Ancre was still not only sustained, but most costly to the attackers, who, in consequence, suspended the advance in this area.

The third phase commenced on 15 Sept. with an advance on a 6-m. front from Ginchy to Courcellette. It was on that day that tanks were first employed in battle, and, speaking generally, they proved a failure at this stage of their development largely through foundering in the mud. They came, however, as a complete surprise to the Germans, and they gave great assistance to the infantry by breaking up machine-gun nests and small posts which either had not been or could not be touched by artillery fire. Ger. resistance began to weaken; on the left the Germans were still holding stubbornly to Thiepval, but even here cracks were becoming noticeable in the defence, and when Pozieres fell, and the victorious Brit. troops advanced beyond it, threatening Thiepval from the E., the Ger. line broke. On the right Comblès was gradually becoming surrounded by the Brit. on the N. and the Fr. on the S., and by 26 Sept. the Fr. were in possession of the place. By the end of July the very definite angle at Thiepval had been flattened out, and the Allies' line ran along the lower N. and E. slopes of the ridge, so that their tactical objective had at length but at great cost, been gained.

Battle of the Ancre.—In Oct. and Nov. further offensive operations were undertaken by the Allies in order to realise more fully such advantages of position as were gained in the Somme battle. As previously stated, Sir Douglas Haig could make little impression on the Germans N. of the Ancre, about Gommecourt and Beaumont Hamel. He now decided to advance in this particular area—an operation known as the battle of the Ancre (q.v.). The Ger. defences had been further improved as a result of experience gained in the course of the Somme battle. The Brit. began operations on 11 Nov. with 2 days' terrific bombardment, and on the 13th captured their first objectives. Steady progress continued to be made

until bad weather brought the operations to a close on 19 Nov., by which time the Brit. line ran E. from N. of Beaumont Hamel and to near Grandcourt, Le Sars, Gueudecourt, and Sully-Saillisel, where it joined the Fr. line which ran S. to just N. of Péronne.

In contrast with 1915 the year 1916 ended on a note of optimism and confidence for the Allies. Their successes at Verdun and on the Somme, albeit costly and, in the nature of modern warfare, inconclusive, had gone far towards establishing a definite superiority over the Ger. war machine and to hold out a prospect of ultimate victory.

Marshal Joffre Superseded.—In Dec. 1916 it had been agreed that the Germans should be given no rest throughout the winter and that the Somme battle should be 'continued' in Feb. 1917. Marshal Joffre advised that the Brit. troops should, in such event, be required to take an even larger share in the operations than heretofore. When this advice became generally known in the Fr. Army it provoked resentment, being interpreted as an aspersion on their valour. The outburst of public criticism resulted in Joffre's supersession on 16 Dec. by Gen. Nivelle, who had become a popular figure by reason of his success at Verdun. At the Ger. H.Q. there was apprehension lest the battle should be renewed at points which would give them no time whether for recuperation or for the accumulation of material. But although it had been agreed among the allied commands that the enemy should be given no rest throughout the winter, this agreement was now ignored. The relations indeed between the allied higher commanders were not at this time the most cordial. Nivelle had prepared a plan which presupposed that Haig should be placed under his orders. To his astonishment Haig found that this plan had been acquiesced in by the prime ministers of both Great Britain and France. It was, however, eventually agreed that the Brit. Army should be 'regarded as allies and not subordinates by Nivelle.' This agreement was not reached until the middle of Mar., with the result that the enemy obtained the respite of which he was in such sore need. During this valuable interval the Germans had been preparing a new defensive system from La Fère on the R. Oise to Arras on the R. Scarpe—a line which gained notoriety among the troops as the Hindenburg line (q.v.). This new line was some m. in rear of the area covered by the Somme offensive of 1916, a point which is to be borne in mind in the light of subsequent events, and particularly Nivelle's supersession by Pétain.

1917. German Retreat to the Hindenburg Line.—The operations on the Ancre, which were brought to a close in Nov. 1916, were opened again in Jan. 1917. The Germans fell back from the commencement, and Gen. Sir Hubert Gough (q.v.), who was in command of the Brit. troops in this area, ordered the attack to be pursued with all possible speed. On

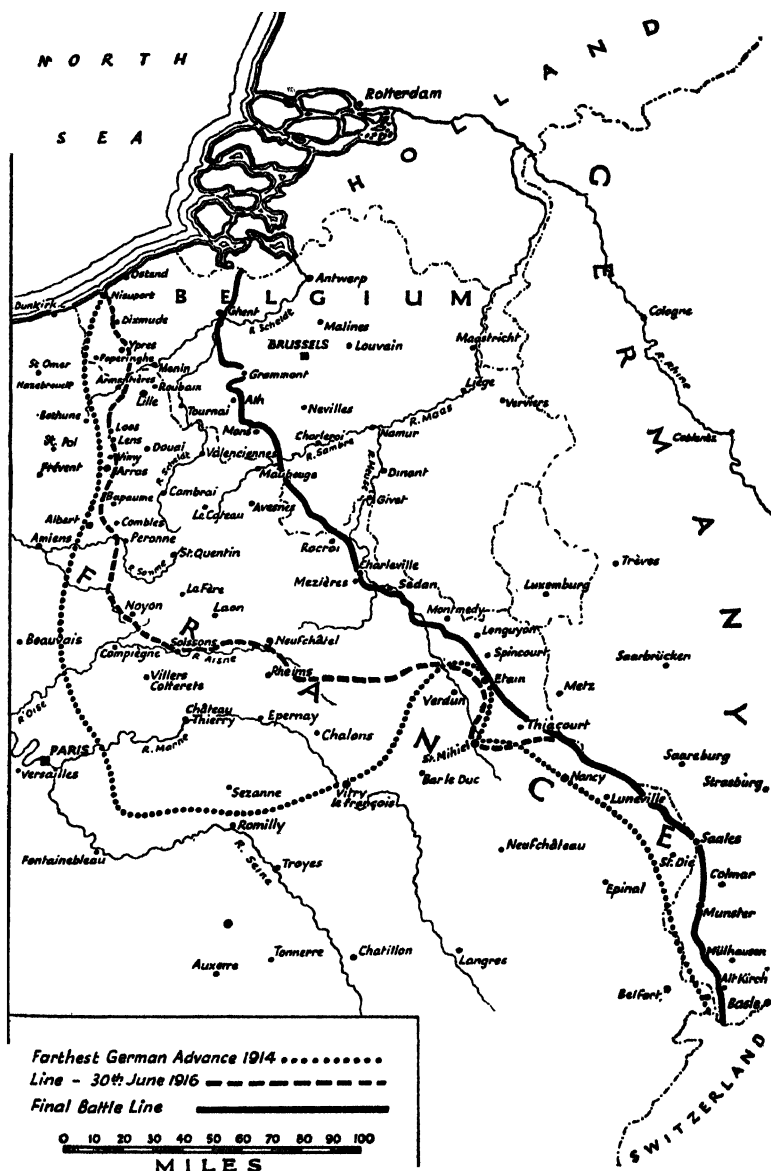
11 Jan. the Brit. captured a spur N.E. of Beaumont Hamel, which enabled them to command the entire Beaucourt valley and the W. slopes of the spur beyond the valley, from Grandcourt to Serre. Operations were at once begun to clear the remainder of the valley S. of Serre hill, and to push the line forward to the crest of the spur. On the night 3-4 Feb. an important Ger. line on the S. slopes of this spur, forming part of the enemy's original second-line system N. of the Ancre, was captured after desperate fighting, and by 5 Feb. Gen. Gough had gained his objective. On 7 Feb. the Gers.' great withdrawal to the prepared Hindenburg line began. In some cases tns were evacuated without any fighting, but in others key positions were defended with the enemy's usual tenacity. By 17 Feb. Miraumont, N. of the Ancre, and Baillecourt farm, S. of the riv., were taken. On 25 Feb. the Germans fell back about 3 m. on an 11-m. front, leaving Serre, Fys, and Warlencourt in Brit. hands. On 28 Feb. the strong Ger. pivot of Gommecourt was captured. By 10 Mar. the important position of Irles fell, and 3 days later the enemy abandoned his main defensive position on the Bapaume ridge. Here the Brit. drove in his rearwards and occupied Gréville and Loupart wood. Bapaume fell on 17 Mar., and by the 18th the Germans were in full retreat from Soissons to Monchy. A rapid Brit. advance gave them Nesle, Chaumes, and Péronne, while further S. the Fr. captured Damery and Noyon. The Germans delayed the allied pursuit by systematically destroying everything along the path of their retreat, and it was not until the allied armies had reached the Hindenburg line, and the pressure became general, that they could develop plans for the future conduct of the campaign.

In Nivelle's original plan for an offensive he had allotted to the Brit. forces a front which included the area from which the Germans had withdrawn. It was naturally expected that the Ger. retreat would necessarily profoundly modify this original plan; but Nivelle decided to make no change. This decision raised misgivings over his capacity for leadership and, coupled with his failure to break through with the Fr. Army on the Aisne between 16 and 20 April, practically decided the Fr. Gov. to supersede him. This was effected on 15 May, when Pétain became commander-in-chief of the Fr. Armies. At this time the morale of the Fr. troops was very low, and mutinies broke out in sev. places. Pétain set to work to eradicate these evils, and in order to keep the Germans occupied while the reconditioning of the Fr. Army was in progress, Gen. Haig was asked to continue the battle of Arras, which had been commenced on 9 April (see ARRAS, BATTLE OF).

Battle of Arras.—The battle of Arras had for its purpose the removal of pressure on the Fr. in Champagne, so that Nivelle's plan for breaking through the Ger. line could be accomplished. The original objectives were the Vimy ridge and Douai.

The ridge was brilliantly captured by the Canadian troops and, generally, the advance was successful at all points during the first few days. The bitter struggle for Lens opened on 14 April, the environs being reached only after the sternest fighting. After a short pause the battle was resumed on 23 April, on both sides of the Scarpe, E. of Arras. Here the pressure increased owing to the bringing up of Ger. reserves. Progress E. of the Vimy ridge was also made between 28 April and 3 May. On the latter date, following a great spurt, the Canadians captured Fresnoy. By the beginning of July the Allies' line had been advanced in this region to just W. of Lens, thence S. to Chérisy. The battle of Messines had already begun on 7 June, the signal for which was the explosion of 19 huge mines under the Ger. line. Gen. Plumer's Second Army carried out the attack, which was launched at 3.30 a.m. The Messines-Wyschaete ridge was stormed, and, before noon, both Messines and Wyschaete were captured. In the afternoon Oostaverne was taken, together with its rearward defences over a 5-m. front, and some 5000 prisoners. Further progress was made on 12 June E. and N.E. of Messines.

Third Battle of Ypres.—Passchendaele.—On 31 July a series of operations commenced known as the third battle of Ypres, which had for their primary purpose the driving of the Germans from their bases on the Belgian coast so as to thwart their submarine campaign. The secondary purpose was to ease the pressure on the Fr. further S. Progress was made S.E. of Ypres, and particularly on the N., where St Julien and Pilckem were captured, thereby depriving the Germans of the ridge from which they commanded Ypres. After the first onset, however, bad weather set in, which made movement impossible. The attack was resumed on 9 Aug. and in the first week the Brit. captured Langemark. The Fr. troops on the left had also made some progress and had captured Graschten. General progress continued E. and N.E. of Ypres until 27 Aug. Three weeks later the battle was resumed along the Menin road, and particularly heavy Ger. counter-attacks were repulsed on 22 Sept. A few days later the Brit. cleared Polygon wood and stormed Zoonebeke. Again the Germans heavily counter-attacked, but were repulsed with the heaviest losses. On 4 Oct. another push was made from E. of Ypres to Langemark, where all tactical objectives were gained. On 9 Oct. a great combined Franco-Brit. attack was made N.E. of Ypres between Passchendaele and Houthulst forest. The Canadians gained the rising ground S. of Passchendaele by the 26th, and the Fr. advanced along the Bixschout-Dixmude road and captured Luyghem. After very gallant fighting the Canadians captured Passchendaele on 6 Nov., and the protracted battle closed with the Franco-Brit. positions well advanced N., E., and S.E. of Ypres.



FRANCE AND FLANDERS, 1914-18

British Attack at Cambrai.—The Germans were given very little respite before the Brit. Third Army, under Gen. Byng, attacked them on 20 Nov. near Cambrai. The Germans had at this time been pressing hard on the It. front with troops drawn from the W. front, and the battle of Cambrai was designed to stop the transfer of Ger. troops to that front. The battle is particularly noteworthy for its novel opening, in that the usual artillery bombardment was dispensed with, tanks being employed instead (see CAMBRAI, BATTLE OF). This revolution in tactics was completely successful, and a deep penetration was made into the strong Ger. positions for 5 m. on a 10-m. front. The prisoners taken numbered over 10,000. Among the places captured were La Vacquerie, Flesquières, Marcoing, Havrincourt, Graincourt, Anneux, and Ribécourt. The next day the Brit. line was advanced S. and SW. of Cambrai. The important position of Bourlon wood still remained in Ger. hands. Hence on 23 Nov. a large number of tanks, supported by infantry, were launched against it, and by nightfall it had been taken, although the vil. still remained with the enemy. Heavy Ger. counter-attacks, however, succeeded in regaining Bourlon wood for the enemy, and the Brit. were withdrawn to a less exposed line. Ger. casualties were about 100,000.

Results of 1917 Campaign.—Thus ended the year 1917 on the W. front, where the allied armies had not only made deep incursions into the Ger. line, but far deeper into their man-power. Nevertheless, owing to the Russian Revolution and the elimination of the Russian Armies as a fighting force, the Germans were rapidly building up their forces on the W. front with accessions of troops from the E. France had reached the limit of her reserves, and Great Britain was approaching that point. The U.S.A. had, however, declared war on Germany, and it was to this source that the Allies looked with confidence for that necessary increase of strength which would bring the war to a victorious conclusion. The control of the war on the Allies' side entered a new era when, as a result of the defeat of the Italians in Oct. 1917 (see CADORNA: CAPORETTO), a conference of allied ministers took place at Rapallo on 6 Nov., at which it was decided to set up a supreme war council at Versailles with military representatives to advise it. Gen. (later Marshal) Foch was appointed president of the military representatives, and was given executive power. Difficulties, however, arose at once, as the new council was not popular with the commanders-in-chief. The Brit. were asked to take a larger section of the front from the Fr., and, in spite of protests from Sir Douglas Haig, the Brit. front was increased.

1918. German Preparations for Final Offensive.—As in the winter of 1916-17, so now a change of command brought misunderstanding and delay in offensive action, during which interval the Germans were preparing for their great and

final offensive in the spring of 1918 on the W. front. Their most important consideration was at any cost to defeat the Allies before the Amer. troops arrived to reinforce them. The most extraordinary precautions were taken to ensure secrecy, for success depended on surprise. No change was made in the troops holding the front nor were they told of the projected offensive. Troops for the assault were assembled well in rear of their line, and all large movements were carried out at night. On 21 Mar. 1918 the Germans attacked on a wide front from La Fère on the S. to Arras on the N. They employed over 60 divs., two-thirds of which were opposed to Gough's Fifth Army, which was covering Amiens, the remainder being launched against Byng's Third Army, which prolonged the line northward. The Fifth Army was widely strung out, and being opposed by such overwhelming numbers, was forced to withdraw. On the other part of the front the Germans met with such obstinate resistance that little progress was made.

Second Battle of the Somme.—The Germans attacked in massed formations, and their casualties were on a colossal scale. Before the offensive had opened the Brit. and Fr. commanders-in-chief had come to an agreement that if one were attacked and not the other, the latter would send reinforcements to the former. Although the attack was launched with the object of 'beating the British,' Ludendorff changed the whole plan as soon as he learned that his Eighteenth Army (von Hutier) had gained a tactical victory over the Brit. Fifth Army, which was in touch with the Fr. He now wished to exploit this victory and separate the Brit. and Fr. Armies by driving a wedge between them. He proposed to do this by rapid advances on both sides of the Somme. He ordered the Fourth, Sixth, and Seventh Armies to attack the Brit. N. of the Somme 'in order to drive them into the sea'; and further ordered that, 'S. of the Somme, the operation was to be carried out offensively against the Fr. by a wheeling movement into the line Amiens-Montdidier-Noyon, followed by an advance south-westward,' direct on Paris. Whilst the Allies were thus being separated the Ger. Second Army was to march on Amiens on both sides of the Somme. In view of the threat to Amiens, it was found impossible for Pétain to carry out his promise to Haig, although the latter was heavily attacked on a 50-m. front. This lack of co-ordination between the Fr. and Brit. in their efforts to resist the Germans was calculated to lead to the most serious consequences, and it was in these circumstances that Foch was given the necessary powers to co-ordinate these operations. He at once began to exercise his personal influence over the various commanders, and to such good effect that the Germans were brought to a standstill on the line Oise-Arras by 4 April, and touch between the 2 armies was maintained. This masterly strategy unquestionably retrieved a most menacing situation. Before this

date, however, the original scope of the Ger. attack had been widened again so as to include the terrain as far S. as the Aisne.

The Battle of the Lys.—The Threat to Amiens.—The second Ger. offensive was launched against the Brit. on the Lys. For some time it had been apparent that an attack was in course of preparation in this area, the evidence being gathered mainly from air photographs. On 7 April the Brit. learned from a prisoner that it was due to start on 9 April. This warning was very opportune to the Brit., for it gave them time to move their reserves into a selected position. Compared with the first or Somme offensive it would seem that the Ger. high command did not intend this later offensive to be on so large a scale, as they employed only 17 divs. Prince Rupprecht was in command, his objective being Armentières in the Ypres sector, as a stepping-stone to reaching the Channel ports. It was therefore essential for the Brit. to defend *d'outrance* every foot of ground. The Ger. pressure was, however, as overwhelming as in their first offensive, and gradually they gained ground, although at great cost. One very important gain was Kemmel hill, which they took on 25 April, but all attempts to pierce the Ypres defences were vigorously repulsed. Further S. the Germans made desperate efforts to reach Amiens, but their way was barred at Villers-Bretonneux by the Australians, who fought with great gallantry. At Givenchy and Festubert, on the left of the Lys offensive, the Germans suffered a severe reverse. This occurred on the day the offensive began. On the Brit. side this part of the line was held by the 55th (W. Lancs) Div. of territorial soldiers, and the attacking troops were the 4th Ersatz Div. The tactics employed by the Germans were those of the successful infiltration type. However, in the result not a yd of the Brit. position was lost, whereas over 750 Ger. prisoners and 70 machine-guns were taken. The Ger. reserves were crowded 3-deep in trenches just in rear, and these were killed almost to a man by Brit. artillery. Fresh reserves sent up in support could not find cover in the trenches already filled with their dead comrades, and so met the same fate above ground. The Brit. had held their ground by small self-contained posts, organised for all-round fire with intervals well laced with barbed wire. Independent platoon counter-attacks had completed the Ger. confusion. This system of defence was found to be the most effective counter-move to the Ger. system of infiltration tactics. As a set-off against this disaster the Germans had occupied the Messines-Wytschaete ridge and the outskirts of Armentières and Merville. Foch had been made commander-in-chief of the allied armies in France and Flanders on 14 April with power to direct their strategical movements, but not their tactical handling. During the third week of April the Ger. supply system became faulty, and Prince Rupprecht asked for permission to break

off the battle, to which Ludendorff agreed.

Final German Offensive Ended.—On 30 April all movement came to a standstill. In Mar. and April the Brit. Army had suffered terrible losses, their casualties amounting to 303,000, including over 28,000 killed.

The third phase of the last Ger. offensive of the war was now being considered. Ludendorff was still of opinion that the Brit. must be beaten, but he could not do this until the allied reserves had either been destroyed or attracted elsewhere. It was therefore decided that the Fr. should be attacked by the Crown Prince William on the Chemin des Dames (q.v.) in order to draw off the allied reserves from the Brit. front. Although the Germans had plenty of ammunition, they were feeling the want of men both in quantity and quality. Thirty divs. took part in this attack, 26 of which had already been employed in previous assaults. The attack opened on 27 May between Rheims and Soissons. It took the Fr. entirely by surprise, and was completely successful, penetration being made on an 18-m. front, and within a few days the Marne was reached between Dormans and Château Thierry. Designed merely as a diversion, it had become a great battle. It was, however, brought to a standstill on 5 June, but not until it had, in the words of von Kuhl, 'gone fatally too far,' for nothing more than a great salient had been created in the Ger. line. They had, however, captured 50,000 Fr. prisoners and 500 guns. On 9 June the Germans launched an attack against Metz, but owing to stubborn resistance it soon subsided.

The topographical result of these offensives of 1918 was the creation of deep salients in the Ger. line, and there were divided counsels at Ger. H.Q. regarding the further action to be taken. Some thought it advisable to go back to the positions held before the first offensive on 21 Mar., but before any scheme could be finally decided the Allies had seized the initiative and launched the counter-offensive which brought the war to a close.

The Final Allied Offensive or Advance to Victory (15 July to 10 Nov.).—In the great allied offensive battle of 1918, or rather series of battles, 2 periods may be distinguished: the first (15 July–26 Sept.), during which the allied high command baffled the enemy's attacks, began to strike in its turn, and forced the enemy to put himself on the defensive; the second (26 Sept.–10 Nov.), when the Allies passed to the general offensive, hit the enemy without respite on the entire front from the sea to the Meuse and so exhausted him that he was compelled to ask for an armistice in order to escape the disaster which the next succeeding attack would have brought on him without hope of being in a position to reply.

The first period comprises the second battle of the Marne; the battle of Picardy. The second, the battle of Champagne, the battle of Cambrai, the battle of Flanders.

The nomenclature of these battles is that of the Fr. general staff. In Eng. records the prin. battles fought during this period by the Brit. Armies are known as the battle of Amiens, 8-12 Aug.; battle of Bapaume, 21-31 Aug.; battle of Arras, 26 Aug.-3 Sept.; battle of Epéhy, 18-19 Sept.; battle of Cambrai-St. Quentin, 27 Sept.-10 Oct.; battle of Ypres, 28-29 Sept.; battle of Courtrai, 14-31 Oct.; battle of the Selle, 17-25 Oct.; and the battle of Maubeuge, 1 Nov. The last Ger. offensive, as already indicated, was in the middle of July, when the Germans began an assault on the Fr. on a front of 55 m. E. and W. of Rheims, their right wing operating on the line of the Marne. From the Fr. side the right of the attack stretched from the vil. of Prunay, E. of Rheims, to the hills known as the Main de Massiges, just W. of the Argonne forest in the Champagne. The left extended from Fossey vil., S. of the Marne and E. of Château Thierry, to Coulommies vil., SW. of Rheims.

As far back as 12 June the rush of the Ger. Armies on Villers-Cotterets on the one side and on Compiègne on the other was stopped. But everything led the high command to suppose that the enemy, after a period of rest for reconstituting his reserves and supplies, would undertake a fresh and powerful effort. Foch was in a position to know at every moment the precise strength of the Ger. Army, to follow its progressive wastage, and to adapt his decisions according to the enemy's situation. At the end of June the Ger. Army was estimated to comprise a total of 207 divs.: 130 in line, 77 in reserve, of which 31 were fresh, 26 reconstituted, and 20 fatigued. It was at first believed that the enemy would attack on the Brit. front, and that the attack would be before the beginning of July; but by 10 July it was clear that the prin. assault would be in Champagne. The Fr. Army, reinforced by divs. of young Amer. soldiers, awaited in confidence the expected attack, and Foch already saw in the 'attack for Rheims' a favourable occasion for turning to the offensive.

From the openings days of July Foch decided to deliver a counter-attack on the front between the Aisne and the Ourcq, this counter-attack to be combined with a second attack on the opposite side of the Château Thierry 'pocket,' so as to close this pocket, or at all events to compel the enemy to evacuate it. At the same time a counter-offensive in E. Champagne was contemplated, to be delivered on the E. flank of the main Ger. attack in the event of the Germans making progress southward. With this end in view, forces were concentrated to the S. of the Argonne. On the same day that the Ger. divs. set out towards the starting points of their assault, allied divs. were concentrating to attack them in flank. This was the first time the Allies had acquired the initiative over the Ger. command. Thenceforth they kept it throughout.

On 14 July, of the 81 divs. of the enemy 30 were disposed behind the troops

in the sector from Château Thierry to the Argonne; and on the morning of 15 July they too combined in the assault.

In the Champagne the Ger. attack gave way in front of the foremost Fr. positions; between Rheims and the Marne it was repulsed in front of the second positions; to the S. of the Marne it secured a foothold on the heights between Jaulgonne and Dormans, forming a pocket from 6 to 8 kms. in depth. Throughout 16-17 July the enemy's whole effort was directed towards Eprenay; but, counter-attacked without cessation, the Germans could make only slight progress. From the evening of 17 July their advance was completely held up. Instead of breaking the Franco-Amer. front and forming a vast pocket in Champagne and Brié, the enemy's attack resulted in nothing better than tactical successes of a purely local character.

The French Offensive begins on the Marne.—On 18 July the Ger. command began to be conscious that they were defeated. It was at this precise moment that Foch launched the offensive with the Tenth and Sixth Fr. Armies. The Tenth Army at one rush reached the approaches to the road from Soissons to Château Thierry. The result of this success was that the knot of roads from Soissons, the branch railroads from Nissy-sur-Aisne over which were passing the supply columns for the masses of enemy troops congested in the Aisne-Marne loop, fell under the fire of the Fr. guns. The Fifth Army, assisted by the 1st Army Corps, took up the offensive between the Marne and Rheims, in liaison with the operations of the Tenth and Sixth Armies. Thus both flanks of the enemy's line were shaken, and the Ger. high command saw that they could no longer engage battle in the pocket, where their communications were threatened. A retreat was ordered.

The Beginning of the German Retreat from the Marne.—The retreat was slow and methodical, but was very costly, by reason of the fact that in order to save the great accumulation of material and stores between the Marne and the Aisne the Germans were continually compelled, by reason of the extraordinary tenacity of the allied attacks, to engage new units. From 18 July the high command had to call for reinforcements from all parts of their front.—Gen. Gallwitz had to dispatch 3 divs. and the crown prince of Bavaria 6. This was not sufficient, for the tired divs. which had delivered the attack in Champagne on 15 July were called upon for a fresh effort, while orders were given to countermand the attack projected against the Brit. in Flanders.

On 19 July the Germans had recrossed the Marne. Before the incessant attacks of the Fr. and Amer. troops they were falling back by the 27th on the Ourcq; and on 4 Aug. they were on the Vesle. Things had therefore gone directly contrary to the Ger. plans. The Ger. front had been pushed back on the Aisne and Vesle; while the Fr. reserves had assumed a brilliant counter-offensive; and only a

very small part (2 divs.) of the Brit. reserves had up to this time been employed in the battle. The reserves of the Bavarian crown prince, on the other hand, were perforce rushed down precipitately from Lille towards the Aisne. Finally the Ger. command had to renounce its cherished plan of an offensive in Flanders, and it was thenceforth open to the Allies to assume the initiative in a new battle between the Oise and the sea.

The Battle of Picardy.—Marshal Foch, in order to retain the initiative and to leave the enemy no opportunity of recovery, perfected his plans for delivering

attack for the flattening out of the St Mihiel salient. So that the counter-offensive of the Marne was hardly organised and set in motion before 3 other distinct operations, each on a large scale, were in course of preparation.

On 23 July the Fourth Brit. and First Fr. Armies attacked on a 15-m. front astride the road from Amiens to Roye and between Albert and Moreuil. In 48 hrs they had advanced over 10 m., reached the outskirts of Chaumes and Quesnoy and were threatening to outflank the Eighteenth Ger. Army from the N. On 10 Aug. the Ger. Army began to fall back



Topical Press

LORD HAIG, GENERAL WEYGAND, MARSHAL FOCH, AND KING GEORGE V ON A VISIT TO THE BATTLEFIELDS AFTER THE WAR

separate attacks in as rapid succession and with as large an element of surprise as possible, to the end that he might bring about the progressive disorganisation of the enemy's armies—and to continue in this manoeuvre until such time as he should order a general attack upon the whole Ger. front. Having verified the fact that, as from 12 July, the enemy was maintaining in line between the sea and the Oise tired troops of poor quality, Marshal Foch meant to derive every advantage from this weakness by undertaking important offensive actions; and he accordingly directed the attention of F.-M. Haig to the Festubert-Robecq front, an attack on which would allow of the liberation of the mining basin of Bruay. He planned, in addition, a joint and simultaneous operation by the Fourth Brit. Army (Gen. Lord Rawlinson) and the First Fr. Army on the Amiens salient in order to free the Paris-Amiens railway; and finally he arranged for the Amer.

on the 1917 positions between Chaumes and the Oise, but, surprised by a sudden attack by the Third Fr. Army, it executed the movement in disorderly haste. By 15 Aug. the Ger. troops were back once more in their 1917 positions on the Chaumes-Ribécourt front, and thus, within the space of a month, the Allies had reduced the 2 biggest salients of the enemy's line—the one towards Paris, the other towards Abbeville—the 2 great objectives of the Germans in 1918.

A serious drain had now been made on the Ger. Armies, but the Amer. Army was not ready to attack at full strength. Hence Foch, instead of pressing the Albert-Oise front, where the enemy had not been sufficiently shaken in his solidly organised positions, carried the attack on the Ger. wings and notably on the N. wing, where the enemy's reserves were known to be diminishing. Whilst the First and Third Fr. Armies were tenaciously engaging the enemy to prevent

him from drawing men from his centre, the Tenth Army was ordered to attack in the direction of Chauny so as to outflank the massif of Noyon-Guiscard-Tergnier; the Third Brit. Army (Gen. Byng) prepared to attack in the direction of Bapaume and Péronne to outflank the Somme defences and constrain the enemy to a more accentuated retreat; and the First Brit. Army (Gen. Horne) was to attack still further N. Between 18 Aug. and 20 Sept. these 3 attacks were all in full motion. As to the first, by 26 Aug. the Tenth Fr. Army had reached the Oise and Ailette Rs.; the Brit. Armies had broken the Ger. front between Croisilles and the Somme; and the Eighteenth Ger. Army was falling back on the Canal du Nord. As to the second, the Tenth Fr. Army, crossing the Ailette, had reached the Hindenburg line, and the enemy was withdrawing to the Aisne. The Brit. First Army in the space of 48 hrs had carried the Drocourt-Quéant (q.v.) switch, and, by rendering the Siegfried line untenable, compelled the Germans to retreat between Arras and the Oise towards the Hindenburg line. As to the third, which began on 18 Sept., the Third and Fourth Brit. Armies, supported by the First Fr. Army, carried the outposts of the Hindenburg line, between Cambrai and St Quentin, and gained their point of departure for the next attack on that celebrated line of defence. Finally, while these last phases of the battle of Picardy were in progress, the Amer. Army in the Wœvre had brilliantly executed its first big attack, reducing the entire St Mihiel salient between 12 and 15 Sept. (see also ARGONNE).

General Offensive of the Allies.—The Battles of Champagne, Cambresis, and Flanders (26 Sept. to 10 Nov.).—Marshal Foch, from the end of Aug., concluded that the time was approaching when the disorganisation and fatigue of the Ger. Armies were such that a general attack would bring about their final defeat. He therefore planned 3 great converging attacks, to be begun simultaneously or at all events at intervals of a few days only. These were (1) *In Flanders*, where the attenuation of the Ger. line from the Lys to the sea, their fatigue and lack of reserves, were offering a favourable situation for exploitation by the Allies. This operation, begun by the Belgian Army supported by Fr. and Brit. divs., had for its first tactical objective the capture of a *point d'appui* or starting point, by carrying the front Clerken forest-Houthulst ridge-Passchendaele-Gheluvelt-Comines; and, for its second objective, to follow this up at once by an attack on Bruges to free the coast, and, by another attack eastward in the direction of Thielt and Ghent. (2) A central operation in which the Brit. Armies and the left of the Fr. Army should attack in the direction of St Quentin and Cambrai, in order to force the Hindenburg line before the enemy should have time to organise, while simultaneously the Fr. centre should carry on energetic operations to drive the enemy

beyond the Aisne; and (3) an operation in the Argonne in the direction of Mézières, in which all the available Amer. troops should attack between the Meuse and the Argonne, supported on the W. by the Fourth Fr. Army, which latter should attack between the Argonne and the Souain road.

The various attacks comprised in this general plan were to set aflame at least two-thirds of the Ger. line on the entire front from the sea to the Meuse, and they were to begin about 25 Sept. In fact the battle of Champagne began on 26 Sept., and after a struggle lasting a week the enemy was compelled to fall back on the Aisne and the Aire, which latter positions were reached by the Allies on 12 Oct. The battle of Cambresis began on 27 Sept.: the First and Third Brit. Armies attacked in the Cambrai region; and on 30 Sept. the battle had extended as far as the Oise by reason of the coming into line of the Fourth Brit. and First Fr. Armies. By 9 Oct. the Second and Eighteenth Ger. Armies had lost the Hindenburg line—a line which their leaders deemed impregnable—and were forced to fall back on the whole front between Douai and St Quentin, and take up new positions behind the Selle R. and on the Bohain-Bernot line. While these 2 armies were falling back the Seventh Ger. Army further S. was evacuating the massif St Gobain-Laon, which, as a result of the allied advance in Champagne and Cambresis, now formed a vast salient, and was retreating to the Serre and taking up positions beyond the Sissonne marshes. (These positions were known as the Hunting line.) This movement was followed by a fresh retreat by the Second and Seventeenth Armies, which, hard pressed by Franco-Brit. attacks on 18 and 19 Oct., were retreating across the Oise and the Sambre Canal. The battle of Flanders, begun on 28 Sept., gave the Allies the hills to the E. of Ypres and threw open in 2 days the Roulers-Menin road. After a short interval it was resumed on 14 Oct. and from the 17th the enemy was compelled in the N. to evacuate the whole Belgian coast and fall back on the Terneuzen Canal, and, in the S., to evacuate the regions of Lille and Lens and to retreat to positions beyond the Scheldt and the Canal du Nord.

Between 10 and 20 Oct. the enemy's retreat had become general on the whole front. Foch gave orders for a prompt renewal of the general offensive from the sea to the Meuse so as to dislodge the enemy from his last defensive organisations (viz. the Hunting and Hermann defences and those of the Lys). On this line Foch calculated that the final battle would be fought. Accordingly simultaneous and converging attacks by the Allies—namely, by the Belgians and Brit. in the direction of Brussels, by the Brit. between the Sambre and Scheldt, by the Fr. Armies in the direction of Givet, and by the Franco-Amer. Armies in the direction of Mézières and Sedan, begun early in Nov.—forced the enemy line into a general retreat between the Scheldt and

Meuse. On 9 Nov, this retreat had stretched northward, and the enemy was abandoning the course of the Scheldt between Oudenarde and Tournai. So that on 11 Nov., the day of the Armistice, all the Ger. Armies between the sea and the Meuse were in full retreat.

The British Victories.—The prin. battles fought by the Brit. Armies in the course of these operations achieved the results indicated:

Battle of Amiens (q.v.) (8-12 Aug.).—Freed Amiens and the Paris-Amiens railway. The attack was then transferred to the N. in the *battle of Bapaume* (21-31 Aug.), which, outflanking the Ger. position on the Somme, obliged the enemy to withdraw to the E. bank of the riv. The new Ger. positions were then turned from the N. by the *battle of Arras (q.v.)* (28 Aug.-3 Sept.) by which the Drocourt-Quéant (q.v.) line was broken and the enemy forced back on the outer defences of the Hindenburg line. As the direct result of these 3 battles the Lys salient was evacuated by the enemy, and Lens, Merville, Bailleul, and Kemmel hill were regained, and Hazebrouck and the railways in that vicinity were freed. At the *battle of Epéhy* (18-19 Sept.) the Brit. broke through the outer Hindenburg defences and took up positions for attack on the main line in the *battle of Cambrai-St Quentin* (27 Sept.-10 Oct.), the biggest Brit. victory of all. At the close of some 10 days of victorious fighting the attacking troops broke through the last and strongest of the enemy's fully prepared positions—positions manned by the very best of his troops. This now opened the way at last to a war of movement and an advance on the Ger. main lines of communication. The Ger. prisoners taken in this battle were more numerous than in any other engagement in the war. This was really the psychological moment of the great campaign of 1918 in the truest sense, for the Ger. morale never recovered from the blow. The victorious Brit. now stormed the Canal du Nord and advanced on Cambrai, turned the formidable defences of St Quentin, and developed all these successes by delivering a general attack on the last of the solidly organised defences in rear of the Hindenburg line. In this, the *second battle of Cambrai*, that in and St Quentin were evacuated by the enemy, who then took up fresh positions on the Selle R., the Brit. having in the battle retaken the double railway line from St Quentin to Cambrai and the important railway junction of Douai.

Even before the close of the first battle of Cambrai the Brit. Second Army, together with the Belgian Army, were forcing the enemy back from Ypres, and driving a salient into his lines which threatened his coastal positions (28-29 Sept.). This success had its sequel in the *battle of Courtrai* (14-31 Oct.), which forced the Germans to abandon the Belgian coast, and with it their submarine base of Zeebrugge. With Courtrai, Menin and Halluin also fell, and the stretch of road between Ypres and Menin

—that veritable mausoleum of Brit. dead in the previous 4 years of fighting—had now for ever ceased to haunt the life of the Brit. soldier and the waiting people at home. The great salients formed to the S. by the *second battle of Cambrai* and to the N. by the battles of *Ypres* and *Courtrai* led indirectly to the evacuation of Laon and the loss of the famous massif of St Gobain (captured by the Fr. Armies). The penultimate of the great Brit. victories was at the *battle of the Selle* (17-25 Oct.), and this was speedily followed by the *battle of Maubeuge* (1-11 Nov.), in which the triumphant armies of Gens. Horne, Byng, and Rawlinson broke the last important lateral communications, turned the Scheldt positions, and sent the enemy in rapid retreat from the vicinity of Courtrai. The strategical aim of the great series of battles was now accomplished, for the enemy's line was now split into 2 parts, one on each side of the great natural barrier of the Ardennes. The pursuit of the beaten enemy all along the line was only stopped by the armistice.

See Sir John French (earl of Ypres), 1914, 1919; J. Buchan, *A History of the Great War*, 1921-2; Sir W. S. Churchill, *The World Crisis*, 1923-9; G. V. Carey and H. S. Scott, *An Outline History of the Great War*, 1928; F. Foch, *Memoirs* (trans. by T. B. Mott), 1931; J. J. Pershing, *My Experiences in the World War*, 1931; P. von Hindenburg, *Out of my Life* (trans. by F. H. Holt), 1933; H. Bidou, *Histoire de la grande guerre*, 1936; L. Hart, *The War in Outline*, 1914-18, 1936; Duffour, *Joffre et la guerre de mouvement*, 1914, 1937; E. O. Volkmann, *Strategie des Weltkriegs*, 1937; *The Private Papers of Douglas Haig*, 1914-1919, 1952; *The War Diaries of Albert I, King of the Belgians*, 1954; also (novels), H. Barbusse, *Feu* (trans. by Fitzwater Wray, *Under Fire*, Everyman's Library, 1926), E. M. Remarque, *Im Westen Nichts Neues* (trans. by A. W. Wheen, *All Quiet on the Western Front*, 1933), 1929; (drama), R. C. Sherriff, *Journey's End*, 1929.

France and Germany Star was instituted for operational service on land, in France, Belgium, Holland, or Germany, from 6 June 1944 until 8 May 1945. The ribbon is in the red, white, and blue of the Union flag, and these colours are also used as a symbol of France and the Netherlands. The 1939-45 star was earned by 6, or for air crew 2, months' service in operations before a candidate could qualify for the F. and G. S. The star was not awarded in addition to the Atlantic Star (q.v.) or the Air Crew Europe Star (q.v.). If a candidate qualified for all 3 stars or 2 of them, the star first earned was awarded.

'France-Soir,' Paris daily newspaper. It was first pub. clandestinely as a monthly in 1941 by a group of Parisian students during the Ger. occupation, under the title of *Défense de la France*. The paper rose in circulation from 5000 to 300,000 in 1943, when it was suspended and 15 of the members arrested. It reappeared publicly a year later, and

after the liberation of France changed its name to *F.-S.* It continually increased the number of copies, reached half a million in 1947, and with 1,400,000 in 1957 is the largest continental daily, with 7 eds. each day. Politically *F.-S.* is independent, and it has a great number of permanent correspondents in France and abroad.

Francesca, Piero della, see **PIERO**.

Francesca da Rimini (*d. c.* 1285), daughter of Guido da Polenta, lord of Ravenna. She was married c. 1275 to Giovanni the Lame (Ghiotto or Sciancato), son of Malatesta, lord of Rimini, when peace was concluded between the houses of Ravenna and Rimini. The elder brother of Giovanni, Paolo the Handsome, was sent to Ravenna to fetch Francesca, and the two fell in love. Giovanni found them together, and killed them both. The story, which has many modifications, is treated in literature in Dante's *Inferno*, and also by Leigh Hunt, Silvio Pellico, Stephen Phillips, and Gabriele d'Annunzio; and in art by Ingres, Ary Scheffer, G. F. Watts, and Cabanel. There are also ballets and operas based on it.

Francesco dei Rossi, see **SALVIATI**.

Franché-Comté, or the co. of Burgundy, ant. prov. in the E. of France, now forming the depts of Doubs, Haute-Saône, Jura, and part of Ain. Known to the Romans as *Maxima Sequanorum*, it was detached from Burgundy (q.v.) in 843, and became part of the empire in 1032. Charles V (q.v.) gave it to the Sp. branch of his family, and it finally became Fr. under the treaty of Nijmegen in 1678. The inhab. of F.-C. were considered to be hardy and independent. Colonies of emigrants from the prov. were to be found in Rome, Milan, Madrid, and other European cities. The cap. was Dôle, and later Besançon.

Franchet d'Espèrey, Louis Félix Marie François (1856-1942), Fr. general who gained a reputation during the First World War. After the battle of Charleroi (Aug. 1914) he was appointed to the command of the Fr. Fifth Army. In Sept. 1914, in co-operation with Foch, he brought to a standstill the Ger. counter-attack from the valley of the Suipe. In June 1918 he was appointed commander-in-chief of the allied forces in Macedonia, and he at once infused his characteristic vigour into the operations on that front, which hitherto had been regarded as stagnant. He organised an offensive against the Bulgarians and in the autumn attacked and broke up their army as a fighting instrument. This success, which threatened Constantinople and hastened Turkey to conclude an armistice, undoubtedly influenced the general collapse of the central powers.

Franchise: 1. An exceptional right or privilege granted by the sovereign, e.g. exemption from ordinary jurisdiction; the right to a manor or lordship, to hold a fair, to have a forest, warren, or fishery, treasure-trove, wafis, and estrays. Such F.s often arise by prescription assumed to have been founded on some original and

lost royal grant. All such F.s belong to the class of incorporeal hereditaments (q.v.).

2. The right of voting for a member of parliament or councillor of some municipal body. (For the qualifications of co. and bor. electors see **ELECTORATE**; **ELECTIONS**.) Generally speaking an action for damages lies for every wilful interference with the exercise of a F., and it is immaterial whether the defendant acted in good faith or under a mistaken notion of duty or not. An elector is entitled to sue a returning officer for refusing his vote.

Franchise, Local Government. Up to the passing of the Representation of the People Act, 1945, the L. G. F. was based on the occupation of rateable property, but that act assimilated the L. G. with the parl. F. by making the normal basis that of residence. Any person in residence of premises on the qualifying day (10 Oct.) is entitled to be registered therefor. There is, however, an additional non-resident qualification for local elections which does not apply to the parl. F. Any person occupying rateable land or premises of not less than £10 yearly value, and not being in his or her area of residence, may claim registration therefor. Only 1 vote is allowed in any area. Joint occupation of non-resident premises will provide a qualification for as many joint occupiers as there are units of £10 yearly value. Limited companies do not qualify for this purpose in this country.

Disqualifications from voting at local elections include: persons under 21 years of age on 15 June before the election; aliens (but not citizens of the Rep. of Ireland, who may vote if otherwise qualified); idiots (but not lunatics); and persons convicted of corrupt and illegal practices during the previous 5 years. Persons undergoing a term of imprisonment for treason or felony are disqualified. Any patient in a mental hospital or person detained in legal custody cannot be treated as resident there. Members of the House of Lords are not disqualified.

See also **ELECTIONS** and **ELECTORATE**; **LOCAL GOVERNMENT**; **LOCAL AUTHORITIES**, **OFFICERS OF**.

Francia, or **Francesco Raibolini** (c. 1450-1517), It. painter, b. Bologna; originally a goldsmith and engraver of dies for medals, and became mint-master at Bologna, not taking up painting till middle age, when he made the acquaintance of Mantegna. He was much influenced by Perugino and Raphael, and Lorenzo Costa (q.v.), with whom he worked. Among his works are 'Virgin enthroned, with Augustine and five other saints' (Bologna Gallery); 'Virgin and Child and St Anne,' and 'Pieta' (National Gallery); 'Virgin' (Munich); 'St Peter, Martyr' (Borghese Gallery, Rome); and the frescoes in the church of St Cecilia, Bologna. See G. C. Williamson, *Francia*, 1901; A. Venturi, *La pittura del cinquecento*, 1925.

Francia, José Gaspar Rodríguez de (1766-1840), dictator of Paraguay, b.

Asuncion, of Portuguese origin, his father, Garcia Rodriguez F., being a native of Brazil who came to Paraguay to manage a tobacco plantation for the gov. F. studied theology at the univ. of Córdoba de Tucuman, and took his doctor's degree, but later turned to the law, and for 30 years was an able and successful jurist and public official. In 1810 the revolution against Spain broke out at Buenos Aires. Though Paraguay at first opposed the movement, it declared its independence in 1811; and F., who had been a leading revolutionary, was made secretary of the national junta. In 1813 he was made joint consul with the Gaucho general, Yegros; in 1814 he secured his own election as dictator for 3 years, and at the expiration of that period obtained the dictatorship for life. He was far from being a mere figure-head and, like Louis XIV, might well have said 'L'état c'est moi.' The accounts of his administration show him to have been a remarkable blend of ability and caprice, of far-sighted wisdom and reckless infatuation, and, withal, a man who, while seeming to aspire to the highest ideals, would yet violate the most elementary principles of justice. His life was one of extreme simplicity, yet he punished with Draconian severity the slightest want of respect. His economic policy was to sacrifice foreign commerce and encourage domestic industries. In eccles. policy he was a bitter adversary of the Church, and abolished both the Inquisition and the College of Theology. Much that was arbitrary in his actions was due to his being strongly influenced by the principles of the Fr. Revolution. His death was much regretted by his countrymen, who forgot his extravagance and remembered only his merits. See T. Carlyle, *Critical and Miscellaneous Essays*, vol. iv. 1840; R. F. Burton, *Letters from the Battlefields of Paraguay*, 1870; and C. A. Washburn, *History of Paraguay*, 1871.

Francis I (1494-1547), king of France, the son of Charles, comte d'Angoulême, b. Cognac. He married Claude, daughter of Louis XII, in 1514, and succeeded him on the throne, 1515. Immediately after his accession he recaptured Milan, and in 1516 signed a concordat with the pope by which the Fr. Crown acquired extensive Church privileges lost only at the Fr. Revolution. On the death of Maximilian, 1519, F. was a rival claimant with Charles of Spain to the imperial crown, and after the election of the latter, F. prepared for Henry VIII the 'Field of the Cloth of Gold,' 1520, but was unsuccessful in securing an effective alliance with England. The Holy See, Venice, and the emperor united to drive France out of Italy, and in 1525 F. was defeated at Pavia and taken captive to Madrid. War continued till 1529, when, by the treaty of Cambrai, F. lost his It. possessions. Hostilities were soon renewed against Charles V. F. allying with the Ger. Protestants and with the sultan in his attempts to crush the imperial power; but no conclusive result had been reached

when F. d. In domestic affairs he greatly strengthened the power of the Crown. His court was notorious for its licentiousness; but F. was, also, an outstanding patron of art and literature, and founded the Collège de France; and, by the acquisition of masterpieces of It. painting and sculpture and in the superb structures of Fontainebleau, Chambord, and Amboise, he had a permanent



FRANCIS I OF FRANCE

influence on Fr. art. See lives by J. d'Orliac, 1933, and F. Hackett, 1934.

Francis II (1544-60), king of France, eldest son of Henry II and Catherine de' Medici, b. Fontainebleau. He married Mary Stuart, queen of Scotland, 1558, whose uncles, the duke of Guise and cardinal of Lorraine, virtually ruled during F.'s brief reign (1559-60).

Francis I (1708-65), Holy Rom. emperor, eldest son of Leopold, duke of Lorraine, b. Nancy. He succeeded to the dukedom in 1729, but in 1735, at the end of the Polish war of Succession, he received Tuscany in exchange for Lorraine. In 1736 he married Maria Theresa, who succeeded her father, Charles VI, to the Hapsburg dominions in 1740. He was elected emperor in 1745, but though nominally head of the state, the prin. political decisions were made by his wife.

Francis II (1768-1835), last Holy Rom. emperor (1792-1806), and 1st emperor of Austria (1806-35), the son of Leopold II, b. Florence. He succeeded his father in 1792. By the peace of Campo Formio (1797) he exchanged the Netherlands and Lombardy for Venetia and Dalmatia. In 1804 he assumed the title of Emperor of Austria, which was confirmed by the Confederation of the Rhine in 1806, when he abandoned the title of Holy Rom. Emperor. By the treaty of Vienna (1809), Austria lost further ters. to France, but was victorious at the battle of Leipzig, 1813, and by the treaty of Vienna (1815), her position in Europe was firmly estab. His chief minister was Metternich (q.v.); but F. himself controlled much of his

country's policy, and was generally reactionary in opinions.

Francis, Sir Philip (1740-1818), politician, *b.* Dublin and educ. at St Paul's School, London. He entered the civil service, and in 1774 went to India as a member of the council of the governor-general. There he was a bitter opponent of Warren Hastings, with whom in 1779 he fought a duel and was wounded. He returned to England in the following year with a considerable fortune, and entered Parliament. He still took an active interest in Indian affairs, and in 1787 assisted Burke and the managers of the impeachment of Hastings to prepare their charges. He is best known as the reputed author of the *Letters of Junius*, but there has never been produced any definite evidence as to the truth of the assumption. See JUNIUS, LETTERS OF. See his *Memoirs* (ed. J. Parkes and H. Merivale), 1867.

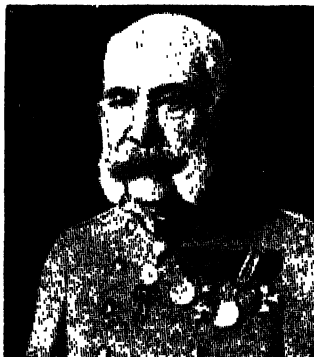
Francis Borgia, St, see BORGIA, FRANCESCO.

Francis de Paola, St (1416-1507). It. religious founder, *b.* Calabria. In 1430 he became a hermit near Paola, and the disciples who gathered round him formed a community known as the Minim friars, which was confirmed as an order by Pope Sixtus IV (1474). F., by command of the same pope, attended the death-bed of Louis XI of France. He remained in that country at the request of Charles VIII, and *d.* at Plessis. Canonised in 1519, his feast is on 2 April.

Francis Ferdinand of Austria, Archduke (1863-1914), nephew of the Emperor Francis Joseph, the son of Archduke Charles Louis, *b.* Graz. After the suicide of Prince Rudolf, 1889, he became heir apparent, but in 1900 made a morganatic marriage with Countess Sophia Chotek, created Princess von Hohenberg, and renounced the right of his future children to the thrones of Austria and Hungary. His assassination at Sarajevo on 28 June 1914 was the immediate cause of the rupture between Austria-Hungary and Serbia, which resulted in the First World War. Very various opinions of his powers as an administrator are held. He was popular in Austria-Hungary, but intensely disliked by the Serbs and Bosnians. This is easily explained by the belief that he was the protagonist in a project to unite the Bosnian Serbs and Croatia-Slavonia with Austria and Hungary into a triple monarchy, a project which involved Austro-Hungarian opposition to any further territorial expansion of the already independent Serbian kingdoms lest such complications should thereby be introduced as would render the project impracticable. It is therefore not surprising that the official Austrian investigation into the murder of F. F. and of his wife by youthful Serbian conspirators having estab. that the outrage was at the instigation of secret revolutionary societies and with the connivance of Serbian Gov. officials, intense indignation was aroused among both Ger. and Magyar elements in Austria-Hungary, who saw in

the murder, and not without reason, a shattering blow at the very existence of the dual monarchy. See monograph by V. Eisenmenger, 1929; and A. J. P. Taylor, *The Habsburg Monarchy*, 1941, 1948.

Francis Joseph (1830-1916), emperor of Austria, the eldest son of the Archduke Francis Charles, 2nd son of the reigning Emperor Francis I, *b.* Vienna. He became emperor in 1848 on the abdication of his uncle, Ferdinand I. At this time Hungary was in a state of open revolt, and declared itself a rep. in the course of the following year, with Kossuth as governor. However, aided by von Brück, F. J. inaugurated a series of fiscal and commercial reforms favourable to the interests of



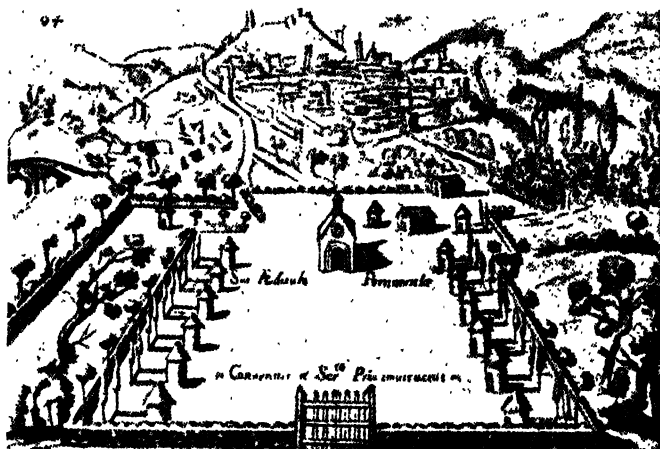
THE EMPEROR FRANCIS JOSEPH

the middle classes, and for some years the empire seemed to recover something of its old position. In 1853 the emperor tried without success to induce the Tsar Nicholas to abandon his designs against Turkey, and in 1859 he had to face a war with France and Sardinia, ending in the loss of Lombardy. In 1866 began the disastrous 7 weeks' war with Prussia, ending with Austria being driven from the Ger. confederation. It was now inevitable that the relations of Austria and Hungary should be rearranged and a reconstruction of the monarchy on a dualistic basis was effected by the *Ausgleich* of 1867, the Emperor F. J. being crowned at Pest. This form of monarchy existed up to the time of the First World War, but, although Hungary proved from 1867 a most loyal Hapsburg possession, Magyar influence tended towards the repression of the Slavonic pop. of the empire, and was thus fundamentally a force destructive to the dynasty.

The emperor's personal life contained v. tragedies. He married Elizabeth of Bavaria in 1854, but the marriage was unhappy, and the empress eventually left him and was assassinated in 1898. Their only son, Rudolf, committed suicide in 1889.

In 1914 F. J. took the fatal step of attacking Serbia, after the murder of his nephew, Francis Ferdinand (q.v.). It may be conceded that he strove in his long reign to maintain a constitutional and parl. regime in Austria-Hungary; but, though he reigned for 68 years, the longest effective reign of modern times, memories of this aged emperor faded away with astonishing rapidity as events in the First World War followed one another in swift succession. Cold, impersonal, stubborn, and unimaginative, and surrounded by reactionary advisers, he nevertheless had a certain popularity, and worked

remained a captive till the following year. The rest enforced by a serious illness in his twenty-second year made him dwell upon his mode of life. On his recovery he attempted to take up arms once more, but was struck down by a second illness at Spoleto. For a time he threw himself half-heartedly into the pleasures of his fellows, though the spiritual conflict was still waging within him. He determined to cast off his old life and to obey explicitly the counsels of the N.T. He adopted the attire of a poor mendicant, took a vow of poverty, and devoted himself to prayer and to helping the poor.



THE PORTIUNCULA, ASSISI, ABOUT THE TIME OF ST FRANCIS

This illustration is from a print in the *Collis Paradisi*, 1704. The largest hut, a little to the right of the chapel, was the infirmary where St Francis died, and the one behind was his cell. The other mud huts and the wall were added after St Francis's death.

conscientiously to hold a disintegrating empire together. Before the First World War it was frequently prophesied that the empire would fall apart on his death. In the event, Charles, grand-nephew of F. J., was crowned with every mark of popular acquiescence on F. J.'s death in 1916. The collapse of the empire, however, was a reality less than 2 years later. See E. von Glaise-Horstenau, *The Collapse of the Austro-Hungarian Empire*, 1930; and A. J. P. Taylor, *The Habsburg Monarchy*, 1941, 1948.

Francis of Assisi, St (1182-1226), founder of the Franciscan order. He was b. at Assisi, a member of the upper middle class, his father, Pietro Bernardone, being a prosperous merchant of that city. As a youth he was a prominent leader of nightly revels, and fought with great spirit in a petty feud between the tns of Assisi and Perugia. Assisi was defeated; F. was taken prisoner in 1201, and

He went on pilgrimage to Rome, and on his return to his native place he worked among the lepers at Gubbio, and gave alms profusely. In spite of the angry remonstrations of his relatives, he continued to walk the streets dressed in the meanest garb, and was frequently pelted with mud by his former companions. At last, in 1206, his father disinherited him publicly, and F., having already united himself to 'holy poverty,' his bride, now renounced his earthly relatives and declared that 'henceforth he had but one Father, Him that is in heaven.'

While praying one day in the ruined chapel of Sta. Maria degli Angeli, known as the Portiuncula, or 'little inheritance,' he had a vision which confirmed him in his vocation. Clad only in a rough woollen garment, girt with a hempen cord, he went out and preached to the poor of Assisi, though only a layman. By 1209 he had gathered round him 11 disciples,

the first 2 being Bernard Quintavalle and Peter Cattano. In the following year the band of 12 went to Rome, where they persuaded Innocent III to sanction their preaching and their mode of life, his authorisation being formally granted in 1215. On his return to Assisi in 1212 F. drew up the constitution of the order. He laid greatest stress on poverty, the other vows of the order being chastity and obedience. Great numbers of disciples flocked around him. F. organised his men and sent them out in bands as missionaries to France, Italy, Spain, and Africa. In 1223 he himself went out to Egypt, and obtained from the sultan promises of better treatment of Christian prisoners and the guardianship for his order of the Church of the Holy Sepulchre. He had to contend with opposition from Rome, where new regulations had been forced upon his order, and the vow of poverty, which to him was so essential, had been relaxed. On 14 Sept. 1224 F. received the stigmata of the very wounds of Jesus Christ upon his own person, while praying on Monte Alverno, near Assisi. Two years later, on 4 Oct., feeling that death was drawing near, he was carried to the Portiuncula, and d. on the bare ground. Pope Gregory IX canonised him in 1228. The chief sources for the life of F. and for the beginnings of the Franciscan order are 2 lives by Thomas of Celano, 1228 and 1248 (Eng. trans. by A. G. Ferraers Howell, 1908); and the *Speculum perfectionis* (Mirror of Perfection), discovered by P. Sabatier (ed. in 1898; Eng. trans. by De la Warr, 1902; and in the Everyman's Library, in which issue are also included *The Little Flowers* and the *Life of St Francis*). According to Sabatier the *Speculum* was the first of all the lives, and was written in 1227 by Brother Leo of Assisi, F.'s favourite disciple; while the *Legenda 3 Soc.* (the legend of his three companions) was a forgery. Thomas of Celano's lives, in Sabatier's opinion, were written in opposition to the *Speculum*. W. Goetz, in a critical review of the whole ground, *Die Quellen zur Geschichte des hl. Franz von Assisi*, 1904, refutes Sabatier's assertions, and comes to the conclusion that the *Speculum* is a 14th-cent. compilation, and largely a forgery. The official life of F. is St Bonaventura's *Legenda*, pub. by the Franciscans of Quaracchi, 1898 (Eng. trans. in Everyman's Library, 1910).

The works of F., including hymns, proverbs, sermons, and letters, were printed in folio in 1739. An ed. in Lat., with an It. trans., was pub. by B. da Fivizzano (Florence, 1880). See Brother Leo of Assisi, *Saint Francis of Assisi* (trans. by S. Evans), 1899; A. Barine, *S. François d'Assise et la légende de ses trois compagnons*, 1901; J. Herkless, *Francis and Dominic*, 1901; P. Sabatier, *Acta Beati Francisci et Sociorum ejus*, 1902; G. K. Chesterton, *St Francis of Assisi*, 1926; W. Seton (editor), *St Francis of Assisi, Essays in Commemoration*, 1226-1926, 1926; *The Little Flowers and the*

Life of St Francis, 1928; H. Goad, *Greyfriars*, 1948; also lives by C. Haase, 1856; Margaret Oliphant, 1871; St Bonaventura, 1888; P. Sabatier, 1893; P. Henry, 1903; and Fr. Cuthbert, *Life of St Francis of Assisi*, 1912. See also FRANCISCANS.

Francis of Sales, St (1567-1622), Fr. bishop and devotional writer, b. of noble family at the castle of Sales, near Annecy, Savoy. After studying at the colleges of La Roche and Annecy, he entered the Jesuit school in Paris (1578) and subsequently studied civil law in Padua (1584-91). Soon after taking orders he went on a missionary expedition to the Calvinists of Chablais, and met with great success. Sev. attempts to murder him were frustrated. He was appointed to the bishopric of Geneva in 1602. He founded a congregation of nuns of the order of the Visitation, of which his friend Madame de Chantal became first superior. His famous work, *Introduction à la vie dévote*, pub. 1609, has been trans. into most European languages. He also wrote a *Traité de l'amour de Dieu*, and *Entretiens spirituels* (pub. posthumously). Canonised in 1665; declared a Doctor of the Church, 1877; and patron saint of journalists, 1923. His feast is on 29 Jan. See the ed. of J. P. Migne, 1861; also lives by C. A. de Sales, 1635; A. J. Hamon, 1856; H. Bordeaux, 1924; F. Strowski, 1928; J. Leclerc, 1928; and F. Ehrenborg, 1937. **Francis Xavier**, see XAVIER, FRANCIS.

Franciscans, or **Friars Minor** (Lesser Brethren), are a religious order of the Rom. Catholic Church founded in 1212 by St Francis of Assisi (q.v.). The order was founded, like most of the early orders, on the threefold vow of chastity, poverty, and obedience. St Francis laid special stress upon the vow of poverty, so that it was not only forbidden to individuals to possess riches, but also it was unlawful for the community to possess property. The vow of poverty was extremely stringent, and the brethren did not even possess the clothes they wore. The order grew rapidly, but the poverty enjoined occasioned much dissension. During the life of St Francis his authority was sufficient to prevent any substantial modifications of the rule in this matter, even after he had abdicated from the post of minister-general. After his death his successor, Brother Elias, attempted to institute changes, but a reaction set in towards St Francis's ideals. Many years of dispute followed, and the order was split into 3 parties. Under Pope Leo X 2 separate divs. were formed: the Conventuals, who by a papal dispensation were released from the extreme poverty originally enjoined, and secondly the Observants, who were strict followers of St Francis. In 1528 Brother Matteo di Bassi formed a new div. called Capuchins (q.v.), because of the peculiar peaked hood which they wore. The Capuchins claim to be the closest followers of St Francis. The F. are under a democratic form of gov. The final authority is

vested in the minister-general, who resides in Rome. Under him are the provincials, each presiding over all the brethren in a prov. The head of each monastery is called the 'custos,' or guardian.

The Conventuals, Observants, and Capuchins constitute the First Order. The Second Order consists of nuns—the nuns of St Clare or Poor Clares, the Capuchin nuns, the Urbanist nuns, etc. The Third Order or Tertiaries consists of sev. millions of members who live in the world, not taking the vow of celibacy, but are bound by the spirit of the rule of the order. More recently certain active congregations of men and women have adapted the principles of the Tertiaries to a conventual regime and are known as the Conventual Third Order. The F. have been foremost in foreign missionary work, and throughout all their internal dissensions they have faithfully continued St Francis's work of ministering to the poor. There are many notable names in the order. Most of the great medieval Eng. theologians were F., as for example John Peckham, Alexander of Hales, Duns Scotus, Wm of Ockham. In the world of letters Roger Bacon (q.v.) was a prominent member of the order. Of the popes, Nicholas IV, Alexander V, Sixtus IV, Sixtus V, and Clement XIV were F. The F. reached England in 1220. At the Reformation there were 65 monasteries in England. After the dissolution of the monasteries the order was restored by the foundation of an Eng. convent in Douai in 1617. There are now 12 houses in Great Britain, and 17 in Ireland; statistics pub. in 1941 gave the number of 24,814 members in 2093 monasteries in 30 countries of the world. See L. Wadding, *Annales Fratrum Minorum*, 1650; P. Gratien, *Histoire de la fondation et évolution de l'ordre des Frères Mineurs du XIII^e siècle*, 1928; A. Masseron, *The Franciscans* (trans.), 1931; V. D. Scudder, *Franciscan Adventure*, 1931; P. Cowley, *Franciscan Rise and Fall*, 1933.

Francium, symbol Fr, atomic number 87. It has long been known that actinium of atomic weight 227 loses electrons spontaneously, but it has also been found to emit α -particles, leaving an element of atomic number 87 and atomic weight 223. It was first called actinium K, but later F. Fr(223) occurs naturally, but 4 other isotopes have been obtained artificially. They are Fr(221), a member of the neptunium series, and Fr(218), Fr(219), Fr(220), which are members of other artificial disintegration series. Its properties so far appear to be those of a typically alkali metal element.

Franck, César (1822–90), Belgian composer and organist, b. Liège, on his father's side of a family which had lived for generations at Gemmenich; his mother was a German, and came from Aachen. He became a naturalised Frenchman in 1873. After an academic career of unusual brilliance in Paris, he began an arduous life of composition and teaching, a life which, although uneventful, was destined to bear great fruit. He

was organist at Notre-Dame de Lorette, then at Saint-Jean-Saint-François (1851), and finally at Sainte-Clotilde—where he had already been choirmaster in 1858. This rendered his financial position more secure, besides enabling him to establish his reputation as an organ soloist. His improvisations left an impression of something unique and profoundly moving. F. gathered together a circle of young, eager students, including d'Indy, Chausson, Lekeu, Bordes, and Duparc, and with them pursued the study of polyphonic and symphonic music; he was indeed the father of a special branch of modern Fr.



E.N.A.

CÉSAR FRANCK

music. His compositions abound in rich harmonic innovations and complicated progressions and modulations, and (except for some early insincere works which are fortunately forgotten) are imbued with a spirit of deep reverence and mysticism, particularly the oratorio *Les Béatitudes*, 1870, and the D minor symphony, 1889. His orchestration often betrays the organist and his treatment of form is highly original, especially his use of recurrent 'motto' themes; and the concerted works for piano and orchestra are full of poetry and romantic charm. In chamber music, besides the famous piano quintet, 1880, and the string quartet in D, 1889, he left the superb violin and piano sonata in A, 1886. Pianists and organists are also indebted to him for sev. fine solo compositions. His writing for the organ is both brilliant and congenial, and the organ works show all his characteristics and supply the instrument with a much-needed enrichment of its repertory. Yet during his lifetime he

was very little appreciated except by his immediate circle. Later, opinion changed so completely that he was for a time venerated to excess; but he is one of those who have inaugurated fresh eras in the hist. of music. See lives by V. d'Indy, 1906, 1930; M. Emmanuel, 1928; C. Tournemire, 1921; N. Demuth, 1949; L. Vallas, 1951.

Frankc, Sebastian (1499-1542), Ger. writer, b. Donauworth. He studied theology, and became a Lutheran parson. His treatise *Vom Laster der Trunkenheit*, 1528, became very popular. Later he drifted away from the school of Luther, and was banished from Strasburg in 1531 because he advocated religious toleration in his *Türkenchronik*, 1530. He also wrote *Paradoxa*, 1534, *Das Weltbuch*, 1584, and pub. a collection of Ger. proverbs. As a religious thinker he was ahead of his times, opposing the rigid adherence to Church forms. See A. Reimann, *Sebastian Frankc als Geschichtsphilosoph*, 1922; and W. E. Peuckert, *Sebastian Frankc*, 1943.

Frankc (formerly Dalp), Swiss publishing house, founded in Bern by Johann Felix Jacob Dalp (1793-1851), 1831, who gave his name to the firm. First pub. were Swiss historical and educational works. Carried on by Karl Schmid (1827-1902), who was particularly active in map-publishing, and also started a number of new magazines, the firm later passed into the hands of Alexander F. (1853-1925), and adopted its present name. F. has become a leading publisher of scientific, historical, and philological works, and is also known for books—in Ger.-Swiss dialect—of outstanding Bernese writers.

Franken (sometimes Frankc), Flem. family of painters, in 4 generations, beginning with *Nicolaes* († 1520-96). His 3 sons who painted were *Hieronymus I* (1540-1610), *Frans I* (1542-1616), and *Ambrosius I* (1544-1618). The next generation was 3 sons of Frans I, viz. *Hieronymus II* (1575-1629), *Frans II* (1581-1642), and *Ambrosius II* (d. 1632). The generation after that supplied *Frans III* (1607-67) and *Hieronymus III* (b. 1611), sons of Frans II. The list is completed by *Constantius* (1661-1717), son of Hieronymus III. The foremost in fame is Frans I. All the family except Constantius painted biblical scenes chiefly; Constantius painted sieges and battles. They were all b. in or near Antwerp. Frans I learned painting at the school of Frans Floris; his father Nicolaes is also said to have learned it there; and the rest of the family painted very nearly in the same style. The other Flem. painters named F. belong to other families—the chief being *Sebastien F.* (or *Francz*) (1578-1647), who painted battles; and his son *Jan Baptist* (1599-1653), an exquisite painter of interiors.

Francoc y Bahamonde, Francisco (1892-), Sp. dictator and leader of the Sp. rebel forces in the Civil war 1936-9, b. in Galicia, and entered the army, where he spent most of his early military

service in Morocco. As commander of the foreign legion, he rebelled, at Ben Tleb, against Primo de Rivera's decision to give up Morocco and the disastrous unpopular war for its conquest. This proved a successful move, for the dictator entrusted F., now colonel (1926), with the control of operations, and the war was now fought to its end. F. now became director of the military academy. At this period the Sp. monarchy was breaking up, and in 1931 F. swore the oath of loyalty to the rep. In 1933 he was in command of the Balearic Is., and, in 1935, became chief of staff of the Sp. Army. Later he was sent by the Lerroux Socialist Gov. as governor to the Canary Is., whence he flew to Morocco to organise the military uprising, in July 1936, that led to the Sp. Civil war. F. assumed the leadership of the rebel forces after Gen. Sanjurjo, their original head, was killed in a plane accident. On 1 Oct. 1936 he proclaimed himself 'Caudillo,' or chief of the State and commander-in-chief. At the close of some 3 years of bitter fighting, in the course of which he received material help in men, planes, and munitions from Italy and Germany, he crushed the Republicans, who had received some support from Russia, and became master of Spain. F. joined the Anti-Comintern Pact (q.v.) in 1939. At the outbreak of the Second World War in 1939 he declared Spain's neutrality, though until well into 1944 his speeches and general policy were markedly pro-German. In 1947, on the 8th anniversary of his seizure of power, F. announced that Spain was to become a monarchy again, with himself as chief of state. The Bill defining the new constitution, however, made it clear that there would be no restoration of a king until the death or disability of F. Since the Second World War F. has successfully maintained his internal position in Spain, despite economic difficulties, and, latterly, difficulties with the Falangists, who have sometimes considered his policy to be veering away from their principles. The pact signed with the U.S.A. in 1953 has been the beginning of Spain's acceptance among W. nations. F.'s rule remains a dictatorship and it is difficult to estimate whether he has in fact been able to acquire any really broad basis of positive popular support.

Franco-Prussian War, The. This war arose out of the candidature of a Hohenzollern prince for the throne of Spain, but was mainly due to the intense jealousy that was excited in France by Germany's rise as a military power, consequent on the defeat of Denmark in 1864 and of Austria in 1866. Though the Hohenzollern candidature was withdrawn, the Fr. emperor, Napoleon III, was not satisfied, and required his ambas. Benedetti to obtain an assurance from the king of Prussia that it would not be repeated. The interview between the Fr. ambas. and the king of Prussia was deliberately reported by Bismarck in such a way as to make it felt in France that a national insult had been received, and war was

declared (15 July 1870). Napoleon had hoped that the S. Ger. states would not support Prussia, and intended to advance into Germany in order to force them into neutrality. In spite of the assurance of the Fr. war minister that the army was ready, it was found (as Bismarck already knew) that no adequate preparations had been made. On the contrary, the Ger. Army was in the highest state of preparation, and by the end of July more than 500,000 men had been mobilised on the Fr. frontier. The Fr. could only offer an opposition of some 250,000 men, inferior in artillery and equipment. The Ger. Army was divided into 3 corps, under Gen. Steinmetz, Prince Frederick Charles, and the crown prince, respectively, while the Fr. formed 2 armies under Bazaine near Metz, and MacMahon in the E. Vosges Mts. The first fight was at Wissembourg (Weissenburg) on 4 Aug., and the Prussians rapidly gained the battles of Wörth over MacMahon, and Forbach over Frossard, thereby preventing the junction of the 2 Fr. armies. Bazaine's army retired to Metz, where its further retreat was prevented by the battles of Rezonville, Gravelotte, and St Privat, while MacMahon marched on Sedan, where he was defeated and compelled to surrender, Napoleon being also taken prisoner. The Ger. armies then hurried on to Paris, which was invested on 19 Sept. In spite of the desperate efforts of the Gov. of National Defence under Trochu, Favre, and Gambetta, which succeeded the empire, disaster followed on disaster. Bazaine surrendered at Metz on 27 Oct. with 100,000 men. D'Aurelle de Paladines gained the battle of Coulmiers near Orleans over the Germans, but was subsequently defeated at Artenay, Loigny, and Patay. Chanzy succeeded in holding the Germans in check around Le Mans, but Bourbaki's attempt to create a diversion by an invasion of Germany failed completely, and his army was forced over the Swiss frontier, where it had to lay down its arms. On 28 Jan. 1871, Paris capitulated, and peace was signed on 10 May, at Frankfurt-on-Main, by which France ceded Alsace-Lorraine and agreed to pay an indemnity of 5,000,000,000 francs. The last stages of the war were marked by the revolutionary outburst of the Paris Commune, quelled by the regular army on 20 May. See F. B. Maurice, 'The Franco-Prussian War, 1870-71' (*Cambridge Modern History*, vol. II), 1909.

Francolin, name given to birds of the genus *Francolinus*, which belong to the *Perdiciidae*. They belong to the Ethiopian region, Arabia, Asia Minor, India, and S. China, and like the common partridge feed on insects and seeds. See **PARTRIDGE**.

Francia (Ger. **Franken**), medieval Ger. duchy, between the Upper and Lower Rhine, Upper Saxony, Swabia, Bavaria, and Bohemia (qq.v.), looked upon by the Ger. people as the cradle of the Frankish race (see **FRANKS**). At the close of the 5th cent. it was conquered by Clovis, king of the Salian Franks, and at

a later period came under the rule of Charlemagne (qq.v.). After the treaty of Verdun (q.v.) in 843 it was the centre of the Ger. kingdom, and was divided into cos., which were ruled over by counts. Conrad, who was duke in F. about 906 was chosen Ger. king in 911. Shortly afterwards F. became immediately subject to the imperial crown, and the region itself was split up into a great number of lordships, countships, and eccles. domains, these last belonging chiefly to the bishops of Würzburg, Worms, Speyer, Bamberg, and Mainz (qq.v.). These bishops were very powerful, and in 1268 the bishop of Würzburg successfully asserted his claim to the title of duke in E. F. In 1501 Maximilian I, when dividing the empire into circles, restricted the title to a circle which included Würzburg, Bamberg, Eichstätt, the abbey of Schönbühl, the dist. of Mergentheim, and the principalities of Bayreuth and Ansbach. The name, however, fell in abeyance after 1806, but was revived in 1837 by Louis I, king of Bavaria, who gave the names of Upper, Middle, and Lower F. to the 3 N. portions of his kingdom. The ter. of F. now forms part of the *Länder* of Bavaria, Baden-Württemberg, and Hesse (qq.v.).

Francs-tireurs (free-shooters), bands of Frenchmen, mainly peasants, who took up arms against the Ger. invaders during the Franco-Ger. war. They carried on guerrilla warfare and (except towards the close of the war, when Gambetta organised them) were not recognised by the Germans as regular combatants, being summarily shot when captured.

Franker, small tn in the prov. of Friesland, Netherlands, 5 m. E.N.E. of Harlingen. It was the seat of a univ. from 1585 to 1811, which was suppressed by Napoleon, and possesses a tn hall dating back to 1591. The chief industries are silk-weaving, shipbuilding, and the manuf. of woollen goods and pottery. Pop. 8060.

Frangipani, see **PLUMERIA**.

Frank, Bruno (1886-1945), Ger. novelist, dramatist, and poet, b. Stuttgart of Jewish parentage. His first work was poetry, *Gedichte*, 1907, and *Die Kelser*, 1920. His first novels were less successful than his later ones, full of life and action, and often dealing with historical figures, as *Trenck*, *Roman eines Günstlings*, 1926, *Cervantes*, 1934, and his drama *Zwölf-tausend*, 1926. He also used contemporary personages in *Der Magier*, 1925, and *Der Reisepass*, 1925. With the advent of Hitler in 1933, F. left for the U.S.A. See H. von Hofe, 'Literature in Exile: Bruno Frank,' in *German Quarterly*, xviii, 1945, 56-91.

Frank, Hans (1900-46), Ger. jurist and administrator, member of the Reichstag from 1930, and head of the legal dept of the National Socialist party. Reich commissioner for justice, 1933-5; minister without portfolio, 1934. He was appointed head of the civil administration in conquered Poland, 1939, and his name became a byword for sadistic cruelty there. He was one of the major figures

tried at Nuremberg after the war, and was found guilty on 2 counts: war crimes, such as murder and ill-treatment of prisoners of war, deportation of inhab., killing hostages, etc., and crimes against humanity, including murder, extermination, etc. (see NUREMBERG TRIAL). Executed 16 Oct. 1946.

Frank, Johann Peter (1748-1821), Ger. physician and public hygienist, b. Rodalben. He studied medicine at Heidelberg and Strasburg, qualifying in 1766. After practising at Rodalben for some years he was appointed prof. at Göttingen (1784) and Pavia (1785-95). He then became director of the general hospital, Vienna, and prof. of clinical medicine of the univ., where he greatly improved the teaching methods. He spent a period at St Petersburg as director of the medical-surgical academy, returning in 1817 to Austria, where he passed his remaining years. Early in his career he commenced work on his great *System einer vollständigen medicinischen Polizei* (9 vols., 1779-1827) and continued working on it throughout most of his life. It was the first systematic treatise on public hygiene, and estab. him as the 'father of public hygiene.' He believed it to be the duty of the State to safeguard the health of the people and to preserve a healthy race by appropriate laws. It dealt with water supply, sanitation, school hygiene, sexual hygiene, maternity and child welfare, vital statistics, etc. He also pub. a work on therapeutics in 7 vols., 1792-1825. See life by K. Doll, 1910, and memoir in *Annals of Medical History*, by L. Baumgartner and E. M. Ramsey, vols. v-vi, 1933-4.

Frank, Sebastian, see FRANK.

Frank-almoigne, or **Free-alm**, name given to a system of tenure in A.-S. times whereby a religious corporation held land. The ordinary feudal conditions were not imposed, but those who held lands in F. were bound before God to offer masses and prayers for the souls of the grantors. See TENURE.

Frank-marriage, species of estate tail in old Eng. law whereby a freeholder granted land to his daughter or cousin or near blood relation on her marriage, to be held by her and her husband and the heirs begotten of their 2 bodies, free from all manner of service, except fealty to the donor or his heirs.

Frank Slide, Alberta, Canada, tn and slide, one of the first communities opened in the Crow's Nest Pass upon the discovery of coal by H. L. Frank of Montana. The tn of F. was situated at the base of Turtle Mt., so named by the Indians because it crept slowly, where the coal mine was operated. On the morning of 29 April 1903 the whole face of the mt came crashing down on the sleeping vil. of F. and wiped out the entire mine buildings, blocked the main tunnel of the mine, destroyed houses in its path, and buried 86 people in its debris. The main line of the Canadian Pacific Railway through the Crow's Nest Pass was buried to a depth of 100 ft. Sixty-six million

tons of rock fell during the slide. In 1931 F. was declared officially closed because of the danger that the mt might fall again. There is a motor highway through the rocks left by the slide and the main line of the Canadian Pacific Railway has been raised about 35 ft from its former level. Pop. 240.

Frankau, Gilbert (1884-1952), novelist, b. London; his mother, Julia F., wrote novels under the name Frank Danby (q.v.). Educ. at Eton, he entered his father's cigar business, of which he became managing director. After the pub. of his first book, *One of Us*, 1912, he went for a business trip round the world. In the First World War he served with the Royal Field Artillery, in the Second with the R.A.F. *The Guns*, 1916, is a book of war poems, and his *Poetical Works* were collected in 1923. He made his reputation as a novelist with *Peter Jackson, Cigar Merchant*, 1919, and followed this with *Seeds of Enchantment*, 1921, *Gerald Cranston's Lady*, 1924, *Martin Make Believe*, 1930, *Wine, Women, and Walters*, 1932, *Three Englishmen*, 1935, *The Dangerous Years*, 1937, *Winter of Discontent*, 1941, and *Oliver Trenton, K.C.*, 1951. *Self-Portrait*, 1939, is an autobiography.

Frankau, Julia, see DANBY, FRANK.

Frankau, Pamela (1908-), novelist, daughter of Gilbert F. (q.v.), was educ. at Stapleton. She took up journalism, then for a time was a copy-writer in an advertising agency. Her novels, which show increasing seriousness as her craftsmanship developed, include *Threc*, 1929, *She and I*, 1930, *Born at Sea*, 1932, *Foolish Apprentices*, 1933, *Tassel-Gentle*, 1934, *The Devil He Knows*, 1939, *A Democrat Dies*, 1940, *Shaken in the Wind*, 1948, *The Willow Cabin*, 1949, *The Winged Horse*, 1953, *A Wreath for the Enemy*, 1954, and *The Bridge*, 1957. During the Second World War she was a major in the A.T.S. She married Marshall Dill, and since 1945 has lived in the U.S.A. In 1942 she became a Rom. Catholic.

Frankel, Benjamin (1906-), composer, b. London. He was early apprenticed to the watch-making trade, but his success in winning a scholarship at the Guildhall School of Music decided his future career. He studied composition there and the violin at the Trinity College of Music. He then continued his studies abroad at Cologne and Berlin. Launched on a musical career, he specialised in light music and acquired a reputation as an expert in jazz and comedy music. His reputation in the film world grew with the music for *The Seventh Veil*, 1945, *The Years Between*, 1946, and *Dear Murderer*, 1947. Meanwhile in the sphere of chamber music his early work showed great promise, fulfilled by his later works, particularly his Trio for clarinet, piano, and cello (Op. 10) and his 4 string quartets, the 2nd of which was selected for performance at the festival of the International Society of Contemporary Music at Copenhagen in 1947. His

Frankenberg

4 3

Frankfurt-am-Main

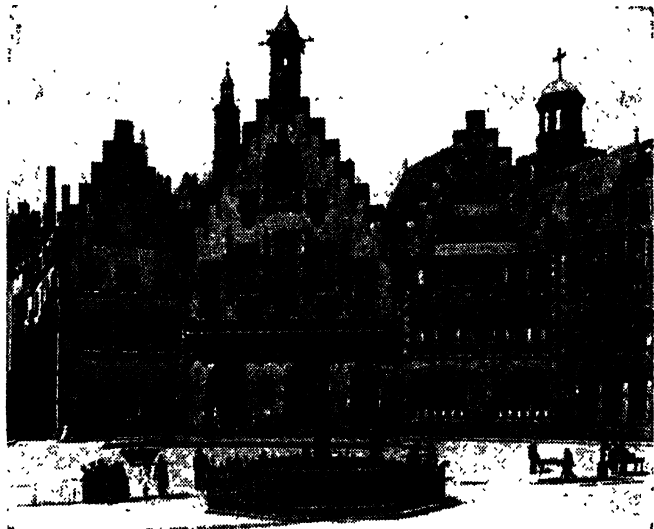
musical powers also found expression in his setting for poems by Robert Nichols, a work for voices, string orchestra, trumpet, and drums, entitled *The Aftermath* (Op. 17).

Frankenberg, Ger. tn in the dist. of Karl-Marx-Stadt, on the Zschopau, 8 m. NE. of Karl-Marx-Stadt (q.v.). It has an ant. castle and has textile and metal industries. Pop. 15,000.

Frankenhausen, Ger. spa in the dist. of Erfurt, on the S. slope of the Kyffhäuser (q.v.), 25 m. N. by E. of Erfurt (q.v.). The peasants, under Thomas Münzer

centre in the Bluegrass region. The prin. manufs. are boots and shoes, twine, furniture, truck bodies, and concrete pipes; it is also a sawmilling and whisky-distilling centre. F. has a fine state capitol, a state penitentiary, and a state normal school for coloured children. The grave of Daniel Boone is here. It is served by 3 railways. Pop. 11,916.

2. City, cap. of Clinton co., Indiana, U.S.A., 40 m. NNW. of Indianapolis. It has meat-packing plant, an oil refinery, and foundries, and manufs. enamel and porcelain ware. Pop. 15,000.



FRANKFURT

D. McLeish

The old market-place and town hall (Römer)

(q.v.), were defeated here by Saxon, Brunswick, and Hessian troops in 1525. The region has salt and potash mines. Pop. 9000.

Frankenstein, see ZARKOWICE SLASKIE.

Frankenthal, Ger. tn in the Land of Rhineland-Palatinate (q.v.), 33 m. S. by E. of Mainz (q.v.). It is near the l. b. of the Rhine (q.v.), with which it is connected by canal. Heavy machinery and furniture are manufactured. Pop. 30,000.

Frankenwald, mountainous dist. of Germany, situated principally in NE. Bavaria (q.v.). It is an undulating plateau of about 2000 ft elevation. See FICHELGEIRGE.

Frankfort: 1. City of Kentucky, U.S.A., the cap. of Franklin co. and also of the state. It is situated on the Kentucky R., which is navigable for 40 m. from the city. It is a trade and shipping

Frankfurt-am-Main, Ger. city in the Land of Hessen (q.v.), on the Main (q.v.), 18 m. E. of Wiesbaden. The name means 'ford of the Franks,' and it is said that this place was shown to Clovis (q.v.) by a deer, when he was leading an expedition against the Alemanni in 496. The tn is mentioned in a document in 793, and seems to have been of some importance because Charlemagne (q.v.) resided in it in 794, and convened a meeting there of bishops from Germany, Gaul, and Italy. A royal palace was built in the tn by Louis I, le Débonnaire (q.v.), and after the treaty of Verdun in 843 F. became the cap. of the E. Frankish kingdom. In 1152 it became the place of election of the Ger. emperors, a privilege recognised in the 'Golden Bull' (q.v.) of 1356; the cathedral was chosen as the election church. In 1372 it was made a

free city of the empire. In 1546 it was occupied by the emperor's troops as a reprisal for its membership of the League of Schmalkald (see SCHMALKALDEN). It was occupied by the Fr. during the Seven Years' War, and in 1792, 1796, 1800, 1803, and 1806. Napoleon created a grand duchy of F., 1810-15, after the end of which the city became the seat of the Ger. Confederation. It was seized by Prussia in 1866; it had espoused the Austrian cause. In 1871 the treaty ending the Franco-Ger. War was signed in F. During the First World War the city was bombed sev. times, and in 1920 it was occupied by the Fr. for a short period. During the Second World War it suffered numerous air raids. The first heavy raid was on 20 Dec. 1943. During the following year the city was a frequent target, and between 29 Jan. and 25 Feb. it sustained 5 major attacks. There were 2 day- and 2 night-attacks in the period 18-24 Mar., including one raid in which 3360 tons of bombs were dropped in 30 min. On 12 Sept it suffered the greatest fire raid yet delivered. The Amer. First Army cut the Ruhr-F. road on 16 Mar. 1945, thereby putting the city in imminent danger of capture. On the following day Gen. Eisenhower warned F. and Mannheim that resistance would lead to their being destroyed from the air. F. eventually fell on 26 Mar. Part of the city was by then in ruins.

The Gothic cathedral was begun in the 13th cent., on the foundations of a 9th-cent. church; its very fine Gothic tower was begun in 1415. The building contains many medieval treasures. There are sev. other medieval, Renaissance, and baroque churches of note. Among the interesting secular buildings are the *Römer*, a group of 8 houses (restored after war damage) which together form the town hall and which date from the 14th cent.; and the Goethe (q.v.) house, which is a rebuilding of the house in which the poet was b.—the original was largely destroyed in an air raid. The univ. dates from 1914, and there are sev. museums and art galleries. Since medieval times the fairs of F. have been important, but in modern times the chief importance of the city has been its pre-eminence as a money market; this has been largely due to the enterprise of the Rothschild family (q.v.). The city is a centre of road and rail communications, has extensive printing and publishing industries, and has metallurgical, chemical, machinery, leather, and foodstuff manufs. Pop. 629,400.

Frankfurt an der Oder: 1. Dist. (*Besirk*) of the Ger. Democratic Rep. (E. Germany), bounded on the E. by the Polish provs. of Szczecin and Zielona Góra; on the S. by Cottbus; on the W. by Potsdam and Berlin; and on the N. by Neubrandenburg (qq.v.). Area 2760 sq. m.; pop. 650,000. See BRANDENBURG.

2. Ger. city, cap. of the dist. of F., on the l. b. of the Oder (q.v.), 50 m. ESE. of Berlin. In the Middle Ages it was an important trading tn, and belonged to the Hanseatic League (q.v.) after 1368. It

was besieged by the Hussites (q.v.) in 1431, by the Swedes in 1631, by the Russians in 1759, and by the Fr. on 2 occasions during the Napoleonic wars. In the Second World War it was taken by the Russians under Marshal Zhukov (q.v.) on 18 Mar. 1945; two-thirds of the city was then in ruins. The part of F. on the E. bank of the riv. has been incorporated in Poland since 1945 (see SŁUBICE). There are engineering, textile, leather, and foodstuff industries. Pop. 60,000.

Frankincense, or *Olibanum*, gum-resin. It corresponds to the Arab *lubān*, the fragrant gum of the *Boswellia thurifera*, a tree plentiful in central and S. India. This aromatic gum-resin is yielded by various trees, though pre-eminently those of the genus *Boswellia*, which grows on the Somaliland and Arabian coasts, whence it reaches Bombay. The chief gum-yielding species of *Boswellia*, besides the Indian *B. thurifera*, are *B. Freereana*, *B. Bhua-Dajiana*, and *B. Carteri*, all of Somaliland, and a variety of the last-named which grows in the Hadhramaut. F. was brought into Palestine by the Arabian merchants (Is. lx. 6; Jer. vi. 20) and was among the gifts offered by the wise men (Matt. ii. 11). It occurs in round or oblong tears covered with a white dust, and is of a yellowish-brown colour, but some is colourless. It has a bitter taste, and smells like balsam when heated. It burns with a bright flame and fragrant odour, and is used in incense (Exod. xxx. 34, etc.), fumigating powders, and in the composition of stimulating plasters, etc.

Franking of Letters, term used for the right of sending letters free of charge. This privilege was claimed by the House of Commons in 1660, but it was not until 1764 that an Act was passed which made the practice legal. After this date every member of Parliament was allowed to send 10 letters a day free of charge, and to receive 15. The privilege was abused, and was finally abolished in 1840, on the introduction of the penny postage. In the U.S.A. F. was instituted in 1776, and remained in force until 1873; it was then abolished, but later restored.

Frankland, Sir Edward (1825-99), Eng. chemist, b. Churchtown, near Lancaster. He worked under Hunsen at Marburg. In 1851 he was appointed prof. of chem. at Owens College, Manchester. He was lecturer in chem. at St Bartholomew's Hospital for a time, and in 1863 prof. of chem. at the Royal Institution. He devised new methods of water analysis, publishing on this subject *Water Analysis for Sanitary Purposes*, and when appointed a member of the royal commission on the pollution of rivers in 1868 did good work. He discovered the theory of valency, which played an important part in the subsequent growth of chem.; and jointly with Sir Norman Lockyer was responsible for the conclusion that the external layers, or photosphere, of the sun are composed of gases and vapours, as well as for the discovery of helium. The highest honour of the Royal Society, the Copley Medal,

was awarded to him in 1894. He was knighted in 1897.

Frankland, Percy Faraday (1858-1946), chemist, b. London, educ. at Univ. College School, the Royal School of Mines, and Würzburg Univ. He was prof. of chem. at Birmingham Univ. (1900-18) and became president of the Chemical Society in 1911. He did much research, and his memoirs, pub. in the *Philosophical Transactions of the Royal Society*, etc., deal with chemical aspects of fermentation, the application of bacteriology to air and water, the sand filtration of water, and the bacterial treatment of sewage. He also pub. *Agricultural Chemical Analysis*, 1883, *Our Secret Friends and Foes*, 1894, *Microorganisms in Water*, 1894, and *Life of Pasteur*, 1897.

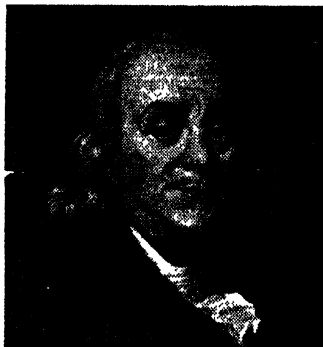
Franklin, Benjamin (1706-90), Amer. statesman, b. Boston, Massachusetts. He was the 15th child in a family of 17, and after 2 years at school he was apprenticed to a printer at the age of 12. He learnt his trade thoroughly, and at the same time became acquainted with the work of editing a newspaper. In 1723 he left Boston for Philadelphia, where he continued work as a printer. In 1724 he sailed for England, where for 18 months he worked in a printer's office. On his return to America he started business as a printer. In 1729 he bought the *Pennsylvania Gazette*, and was so successful in editing the paper that 3 years later he brought out *Poor Richard's Almanac*, which he continued to issue for 25 years, and which became famous in the Amer. colonies for F.'s pithy maxims on the virtue of thrift and hard work.

About this period of his life he made many scientific investigations. He estab. the identity of lightning with electricity, by means of his famous demonstration with a boy's kite, and suggested the use of lightning conductors on large buildings. Amongst his scientific researches, 2 very useful pieces of work were the discovery of the Gulf Stream and of its course, and the discovery of the course of the storms that cross the continent of North America.

He began to take a prominent part in the political life of Pennsylvania. In 1737 he was postmaster of Philadelphia and from 1751 to 1764 was a member of the colony's legislative body. As early as 1754 he was ardently advocating an inter-colonial union, the better to present colonial claims to the Eng. Gov. In 1757 he was drawn away from his scientific work by the urgency of the political situation in Pennsylvania. In that year he was sent to London to represent the grievances of the colony with regard to taxation. In that mission he was so successful that in 1771, being in England again, he was asked to protest against the Stamp Act. In 1775 he returned to America and helped to draw up the Declaration of Independence. During the war of Independence he represented the states in Europe. In 1778 he was recognised as minister of the U.S.A. by France. He brought about the treaty of

Paris, and was instrumental in obtaining a good deal of help for the states. It was mainly through his diplomacy that France was brought into the war. At the close of the war he remained in Paris as minister of the states, and then returned to take part in framing the constitution of the new nation.

J. Bigelow has ed. a complete ed. of F.'s works. Except for his early journalistic writings and his famous autobiography these are mainly in the form of private letters. Even his scientific discoveries were made known to the world through his letters to his friends. His autobiography was ed. by J. Bigelow and pub. in 1868. The 'Complete Edition' was



BENJAMIN FRANKLIN

Engraving by J. A. Thomson after the original painting by J. A. Duplessis

produced by Bigelow in 1887-9, but the best ed. is the Centennial, by A. H. Smyth (10 vols., 1905-7). See W. C. Bruce, *Benjamin Franklin Self-revealed*, 1917; P. Russell, *Benjamin Franklin, the First Civilised American*, 1926; Bernard Fay, *Franklin, the Apostle of Modern Times*, 1929; C. van Doren, *Benjamin Franklin: a Biography*, 1939; and Everyman's Library ed. of the *Autobiography*.

Franklin, Sir John (1786-1847), Arctic explorer, b. Spilsby, Lincs. He entered the R.N. on board the *Polyphemus*, and took part in the battle of Copenhagen in 1801. Two months later he was appointed midshipman to the *Investigator*, under Capt. Matthew Flinders, and showed remarkable ability for nautical observations on the voyage to Australia. He was present with Commodore Dance in his engagement with Linois in 1804, and took part in the battle of Trafalgar in 1805. Two years later he joined the *Bedford*, and sailed in that ship in the expedition against New Orleans in 1814, where he was wounded. In 1818 he was appointed to command the *Trent*, and accompanied Capt. Buchan in a voyage of discovery in the Arctic regions. In 1821

he was elected a Fellow of the Royal Society. From 1825 to 1827 he was again occupied in exploring the Arctic regions, and on his return to England was knighted. From 1836 to 1843 he was governor of Van Diemen's Land (Tasmania). In 1845 he set out in the *Erebus* with Capt. Crozier in the *Terror* to discover a NW. passage to the Pacific, and his ships disappeared into the unknown N., having last been seen near the entrance to Lancaster Sound. In the ensuing 10 years over 40 expeditions were sent to clear up the mystery of their fate, mostly through the efforts of Lady F., and only gradually was their tragic story pieced together (1851). After spending almost 18 months in the ice near King William Is., F.'s party abandoned the ships and tried to march out to safety. Not a man survived. But F. left a name as a great leader in the story of hazardous adventures in the Arctic. He showed the existence of the NW. passage, and his work resulted in the discovery of a second NW. passage in 1850. He wrote *Narrative of a Journey to the Shores of the Polar Sea, 1819-22, 1823*, and *Narrative of a Second Expedition to the Shores of the Polar Sea, 1828*. See also ARCTIC EXPLORATION. See A. H. Beesly, *Franklin*, 1881; A. H. Markham, *Life of Sir John Franklin*, 1891; H. D. Traill, *Life of Franklin*, 1896; W. F. Rawnley (ed.), *The Life, Diary, and Correspondence of Jane, Lady Franklin*, 1923; Mrs Gell, *John Franklin's Bride*, 1930; K. Fitzpatrick, *Sir John Franklin in Tasmania*, Melbourne, 1949; F. J. Woodward, *Portrait of Jane*, 1951; G. F. Lamb, *Franklin, Happy Voyager*, 1956.

Franklin, Miles (1879-1954), Australian novelist, b. near Tumut, New South Wales, of pioneering stock. She grew up on a dairy farm near Goulburn which she used as background for her famous first novel, satirically entitled *My Brilliant Career*, 1901 (with preface by Henry Lawson, q.v.). This spirited story of a girl's rebellion against the narrowness of her bush life and the feminine conventions is deeply Australian in feeling and has become a landmark in Australian literature. *My Career goes Bung*, 1946, was considered too daring for pub. at the time it was written. She spent 30 years in the U.S.A. and England as a journalist, social worker, and militant suffragette. On her return to Australia she wrote *Old Blasius of Bandicoot*, 1931, which portrays another bush girl's fight for freedom and deals with the selection of the site for Canberra. *All that Swagger*, 1937, a novel of horse and cattle pioneering from the 1830's in the wild country of the Upper Murrumbidgee R., has given a legendary character to Australian literature in old Danny Delacy: 'I'm free meself and would wish every man-jack, black and white, to be the same.' M. F.'s name has been strongly associated with 3 other novels of epic scope set in the same region and pub. under the pen-name 'Brent of Bin Bin': *Up the Country*, 1928, *Ten Creeks Run*, 1930, and *Back to Bool Bool*,

1931. Also by M. F. are *Joseph Furphy*, a biography, 1944 (see COLLINS, TOM), written in association with Kate Baker, and *Laughter, not for a Cage*, 1956 (pub. posthumously), a provocative assessment of Australian novel writing. See also AUSTRALIAN LITERATURE. See *Miles Franklin: A Tribute*, 1955, by some of her friends.

Franklin: 1. City in New Hampshire, U.S.A., about 17 m. N. of Concord, at the confluence of the Pemigewasset and Winnepesaukee R.s to form the Merrimack. The rivs. furnish good water power, which is extensively used in the manufs. The chief are paper and pulp and hosiery. Daniel Webster was b. here, and the house is used as a museum. F. was first settled in 1764 and incorporated as a city in 1895. Pop. 6550.

2. Tn, cap. of Venango co., Pennsylvania, U.S.A., about 35 m. from Erie. It is the centre of the chief oil region of the state, and manufs. boilers, engines, steel castings, and iron goods. Pop. 10,000.

3. Dist. in N. Canada, named after Sir John F., which includes Banks, Prince Albert, Victoria, Wollaston, King Edward and Baffin Land, Melville, Bathurst, Prince of Wales, and Cockburn Is. Area about 500,000 sq. m.

Franklin, landowner of free but not of noble birth in 14th and 15th cents. in England. In status he was above the villeins. There is a F. in Chaucer's *Canterbury Tales*, and the word also occurs in Scott's *Ivanhoe*.

Franklin Institute, Philadelphia, Pennsylvania, was founded in 1824, the oldest society in the U.S.A. for the study of the mechanic arts and the application of science to industry. In 1826 it opened the first high school in Philadelphia; later it abandoned teaching except in technical subjects. It includes the Fels Planetarium, a permanent technological exhibition, halls for mechanical and industrial exhibits, a library with a record of patents granted by the U.S.A. and other countries, and a laboratory for biochemical research. It publishes a scientific jour. and awards medals for distinguished scientific achievement.

Frankpledge. From the earliest times in England there was a custom whereby a man's relations were responsible for his behaviour; out of this grew the principle of forming institutions for mutual security. A number of men formed an association in which they were answerable each for the others; if one committed a crime, the others were liable for his appearance to make reparation, and if he disappeared, the others had to pay the penalty unless they could prove their innocence. These societies were called *frithborhs*, or peace-pledges, and the Normans mistranslated the A.-S. words as F.

Franks, Sir Oliver Shewell (1905-), scholar and diplomat, educ. at Bristol Grammar School and Queen's College, Oxford; Fellow and Praelector there, 1927-37. He was a univ. lecturer in

philosophy, 1935-7, and prof. of moral philosophy, univ. of Glasgow, 1937-45. F. was a temporary civil servant at the Ministry of Supply, 1939-46, and a permanent secretary, Ministry of Supply, 1945-6. He was provost of Queen's College, Oxford, 1946-8. From 1948 to 1952 he was Brit. ambas. in Washington, his period of office being conspicuously successful. He later became chairman of Lloyds Bank Ltd.

Franks, The, name given to a confederation of tribes of Teutonic origin who inhabited the lower and middle Rhine valley during the 3rd cent. AD. The tribe may be divided from about the 4th cent. into 2 main groups, the Salian F. who dwelt on the lower Rhine, and the Riparian F. on the middle Rhine. Towards the end of the 3rd cent. the F. began to move W. About 350 the F. were defeated by the Emperor Julian and became a dependency of Rome, but when Clovis (481-511) became king of the Salian F.s the Rom. yoke was thrown off. Clovis defeated the Alemanni round the R. Seine in 495, and by 501 obtained an ascendancy over the Riparian F., thus considerably extending his empire and forming the nucleus of the kingdom of France. During his rule, also, the F. adopted Christianity, but remained subject to their Salic law. They obtained military supremacy in N. Gaul and founded the 1st dynasty of Fr. kings. By c. 597 they were divided into the Austrasian and Neustrian F., who continually struggled for ascendancy over each other, the Merovingian dynasty being finally superseded (752) by the Carolingian.

Františkovy Lázně (Ger. *Franzensbad*), Czechoslovak spa in the region of Karlovy Vary (q.v.), at the W. end of the Erzgebirge (q.v.). The waters are exported in bottles. Pop. 2300.

Franz, Robert (1815-92), Ger. composer, b. Halle. He suffered in early life from the opposition of his parents to a musical career, but eventually was allowed to go to Dessau to study organ-playing under Schneider. In 1843 he brought out a book of songs, which subsequently was followed by nearly 50 other books, containing altogether about 250 songs. The songs are mostly for mezzo-soprano voice, lyrical, and finished in execution. Unhappily deafness began to afflict F. before he was 30, while, owing to a nervous disorder, he had to resign his post of organist to the city of Halle and his other offices. But his future was provided for by the proceeds of a concert tour arranged by Liszt and others. He made arrangements of vocal works by Bach and Handel which are now discredited, but lives by his songs, which rank very near the best in Ger. music.

Franz Josef, see FRANCIS JOSEPH.

Franz-Josef Land, see ZEMLYA FRANTSIA-IOSEFA.

Franzén, Frans Michael (1772-1847), Finnish-Swedish poet, b. Uléaborg, Finland. In 1798 he was prof. of literature, in 1801 prof. of hist., and in 1808 was elected a member of the Swedish Academy.

On the cession of Finland to Russia he went to Sweden, and became in 1831 bishop of Härnösand. His earlier verse, as *Skaldestycken*, 1810, was lyrical and sentimental. After his ordination his tone became more philosophical and religious. His idealism and rich imagery link him with the Romantics.

Franzensbad, see FRANTIŠKOVY LÁZNĚ.

Frascati, It. tn. in Lazio (q.v.), situated on the Alban Hills (q.v.), 10 m. SE. of Rome (q.v.). It is 1050 ft above sea-level, and has long been a popular summer resort. It has a cathedral, sev. other interesting churches, and many beautiful villas and parks. The tn was very severely damaged during the Second World War, but the damage has since largely been made good; one villa, the *Villa Torlonia*, was for a time the H.Q. of Kesselring (q.v.), and was subsequently destroyed. F. is known for its market gardens, and for the white wine to which it gives its name. Near to the tn is the site of the anct city of Tusculum (q.v.). Pop. 13,000.

Fraser, Peter (1884-1950), New Zealand statesman, b. Fearn, Ross-shire, Scotland, and educ. at a board school. He began his political activities as a local officer of the Liberal party. In 1908 he joined the Independent Labour party in London. He emigrated to New Zealand, 1910, and played a prominent part in the Labour movement there. He was a member of the House of Representatives for Wellington Central from 1918; a member of Wellington City Council, 1919-23 and 1933-6; and of Wellington Harbour Board, 1933-8. He was New Zealand delegate to the Empire Parl. Association Conference, 1935; minister of education, health, marine, and police, 1935-40; and Prime Minister, 1940-9, also minister of external affairs and of is. ters. of New Zealand during this same period. During the Second World War he attended meetings of the War Cabinet in London, and tried to keep personal contact with New Zealand's forces in all theatres of war. F. led the New Zealand delegation at the San Francisco Conference (q.v.), 1945, and again at the first meeting of the U.N. Assembly, 1946. In a general election at the end of Nov. 1946 F. was returned to office, but only by securing the 4 Maori seats, dividing the others equally with the National party. The result was interpreted as a rebuff to the Radical wing of Labour, and as giving a mandate to F. to pursue his humanitarian policies but not to make any further extension of direct nationalisation. In 1947 F.'s gov. took over for the State all insurance relating to workmen's compensation. An 'aid to Britain' conference was held at Wellington in Aug. and initiated a substantial programme of economy and increased production designed to help the U.K. in its financial difficulties. F., who was chairman of the third commission (social, humanitarian, and cultural questions) at the London session of the U.N. in 1946, also attended the Paris session in 1948; after which he travelled extensively

in Germany. He was defeated at the general election of 1949.

Fraser, Sir Robert Brown (1904-), Brit. journalist and administrator, b. Australia and educ. at St Peter's School, Adelaide, and Melbourne and London Univs. He was leader-writer on the *Daily Herald*, 1930-9, subsequently working in the ministry of information. He was director-general of the Central Office of Information, 1946-54, when he was appointed Director-General of the

around Quesnel and Williams Creek, the F. is now famous for its salmon fishery. The F. valley, which extends almost from Hope to the confines of Vancouver, is notable for its fertility, and supports a large farming and dairying pop. In 1948, when the riv., swollen by melting snows from the Rocky and Cascade Mts, rose some 26 ft above summer level, the valley suffered severely from flood. Named after Simon F., who explored it in 1803, the F. has a length of 785 m. Its chief



Agent General for British Columbia

THE FRASER RIVER AT HELL'S GATE

Independent Television Authority. He was knighted in 1949.

Fraser, Simon, see **LOVAT, LORD**.

Fraser, chief riv. of Brit. Columbia, rises in the Rocky Mts in the vicinity of the Yellowhead pass, and flows in a NW. direction for 277 m. to Giscombe, where it makes a turn almost due S. through the centre of the prov. for 413 m. to Hope. Here it turns again and continues W. for 95 m. to empty at New Westminster into Georgia Strait. At Lytton, 65 m. N. of Hope, the riv. is joined by its largest trib., the Thompson, and from this point lines of the Canadian Pacific and Canadian National Railways run along the riv. to the coast. Scene of the earliest discoveries (1858) in the prov.

tribs. are the Morkill, Bowron, McGregor, Willow, Salmon, Nechako, Blackwater, Cottonwood, Quesnel, Chilcotin, Bridge, Thompson, Harrison, and Pitt.

Fraser Island, or **Great Sandy Island**, off the S. coast of Queensland, Australia, stretching from Wide Bay to Hervey Bay. There is excellent fishing.

Fraser of North Cape and Molesley, Bruce Austin Fraser, 1st Baron (1868-), Brit. adm., son of Gen. Alexander F., R.E. Educ. at Bradfield School. Flag captain, East Indies. Commanded the *Glorious* (see **AIRCRAFT CARRIER**); chief of staff, Mediterranean Fleet; Third Sea Lord and Controller, 1939-42; second in command, home fleet, 1942; commander-in-chief, home fleet, 1943-4; adm., 1944; com-

mander-in-chief, eastern fleet, 1944; of the Pacific fleet, 1945-6; commander-in-chief, Portsmouth, 1947-8. On 26 Dec. 1943 the great Ger. battle cruiser *Scharnhorst* (q.v.) was brought to action and sunk off North Cape, Norway, by units of the home fleet under the command of F., which were escorting to Russia a convoy of exceptional importance. In Aug. 1949 he was appointed First Sea Lord in succession to Admiral of the Fleet Sir John Cunningham.

Fraserburgh, seaport tn in Aberdeenshire, Scotland, on the S. side of Kinnaird's Head, and W. of F. Bay. It is noted for its herring fishery, and has considerable export and import trade. It has a good harbour. Originally called Faithlie, the name was afterwards changed to F. in honour of its founder, Fraser of Philorth. Pop. 10,500.

Fraser's Highlanders, see SEAFORTH HIGHLANDERS.

Fraserville, see RIVIÈRE-DU-LOUP.

Fratellini, name of a famous family of Fr. clowns, which has been called the 'dynasty of clowns.' Gustave F. was the first of the family to work in a circus. The elder of his sons, who appeared in London in the first decade of this century, had 2 sons who performed, together with their brother-in-law, as a trio of clowns. Good though they were, they were eclipsed by the world-wide celebrity of their cousins, the family of Gustave's younger son. This latter family appeared in England in C. B. Cochran's revue *Dover Street to Dixie*, the 3 being Paul, Albert, and François F. In Paris they were idolised and were almost an institution at the Cirque d'Hiver. Paul (d. 1940) was the simple fellow with the large red nose, who played the bombardon.

Fraternalities and Sororities, societies of students estab. in nearly all the colleges of the U.S.A. and Canada with the objectives of promoting social intercourse, good scholarship, and participation in college activities. There is little secrecy in their organisation beyond measures taken to protect their constitutions and mottoes. They are called Gk-letter societies, as Gk letters are used to name each. Each has a distinguishing badge bearing symbols and monograms. They are divided into chapters, not more than 1 chapter of a given society being at any college. The first, the Phi Beta Kappa (q.v.), was organised at Wm and Mary College in 1776. There are over 60 men's national F. in the National Interfraternity Conference with total membership of over 3,000,000; 30 women's S., with membership of over 800,000, comprise the National Panhellenic Congress. In addition, there are many local F. not associated with the national organisations, and many men's and women's professional and honorary F. and S. See Baird, *Manual of American College Fraternities* (15th ed.), 1949.

Fratelli, or Frérots (Little Brethren), religious sectaries of the 14th cent. Claiming to be the true followers of Francis of Assisi they refused to submit to

the Church and formed a separate organisation, professing apostolic poverty, and having no settled abode. They were suppressed spasmodically by Church and State in the 15th cent.

Fraïres Arvales, see ARVAL BRETHERN.

Fraud, legal term of such wide meaning that it may be said to be implied in every civilly or criminally wrongful act, whereby one person is prejudiced by the deception of another. To sustain an action of deceit or F. the person aggrieved must prove (1) the statement was untrue in fact, and made apparently or in reality with the intent that he should act upon it; (2) the person who made it either knew of its falsity or was ignorant whether it was true or not; and (3) he (the plaintiff) acted upon it and, in consequence, suffered damage. It is not essential to an action of F. that express words should have been used by the defendant, if by his conduct, suggestions, or active concealment of something material he causes the plaintiff to be misled. But a *suppression veri* (suppression of truth) is only regarded as tantamount to F. where the withholding of that which is not makes that which is stated absolutely false. Merely allowing a man to continue to act on an erroneous assumption is not defrauding him if the other person in no way contributed to such error. Generally speaking, F. implies a misrepresentation of existing fact. A principal is liable for the F. of his agent where committed in the cause of the principal's business and ostensibly for his benefit; a husband is liable for his wife's F., and a partner for that of his co-partner. A contract induced by F. is voidable at the option of the defrauded party, for *fraus vitiat omnia* (F. vitiates everything), and besides rescinding the contract he is also entitled to damages, but he may, if he choose, leave the contract subsisting and at the same time sue for any damage he has suffered. In accordance with the above maxim it has long been settled that F. in all courts and at all stages of any particular transaction, if proved, at once vitiates the proceedings.

Formerly, false statements made negligently but without active deceit, or false statements made on insufficient grounds, were held to amount to what was called 'legal F.' But the rule now is that no false statement made with an honest belief in its truth can render the maker liable for F. In consequence of this ruling (which is to be found in the classic case of *Derry v. Peek*) the Directors' Liability Act, 1890, makes directors and promoters of a company liable in damages for misstatements in a company prospectus inviting the public to subscribe to shares only where such statements were made without reasonable grounds for believing in their truth.

In the criminal law many offences necessarily imply F. (for civil remedies for crimes see CRIMINAL LAW), e.g. obtaining by false pretences, embezzlements (q.v.), and all unlawful appropriations by all manner of agents, trustees, and others entrusted with property. In a charge of

falsifying accounts it is not necessary to show that any particular person was intended to be defrauded. For rendering void fraudulent conveyance by a bankrupt as against his creditors, see CONSIDERATION.

Frauds, Statute of, 1677. Although this statute was intended to prevent fraud in contracts, its operation in practice often had the opposite effect and caused great hardship. It made certain classes of contract unenforceable unless evidenced by writing (see CONTRACT) or, where practicable, supported by the equitable doctrine of 'part performance.' That doctrine applies where one party to a contract, usually for the sale or purchase of land, having acted on the other party's promise to perform his part of the bargain, has done something to fulfil his own obligations (part performance) and seeks to enforce the contract. An act of part performance which clearly refers to the transaction in question will be regarded by equity as evidence of the formation of a contract, notwithstanding the absence of writing. Since the passing of the Law Reform (Enforcement of Contracts) Act, 1954, contracts of guarantee and those relating to interests in land are the only classes still required by section 4 of the S. of F. to be evidenced by writing.

Frauenburg, see ERMELAND.

Frauenfeld, cap. of the canton of Thurgau, Switzerland, situated on the R. Murg. It has a 10th-cent. castle. The manuf. are cottons, silks, woollens, and iron and aluminium goods. Pop. 12,300.

Fraueninsel, see CHIEMSEE.

Frauenlob, see HEINRICH VON MEISSEN.

Fraunce, Abraham (c. 1558-c. 1633), poet, b. Shropshire. Educ. at Shrewsbury and St John's College, Cambridge, of which he became a Fellow in 1580, he was later called to the Bar at Gray's Inn. He enjoyed the patronage of Sir Philip Sidney and of his sister, the countess of Pembroke, to whom sev. of his books were dedicated, and was one of the group who advocated the use in Eng. poetry of classical metres; all his own poems are in hexameters. He was a close friend of Spenser, who introduced him as Corydon into his *Colin Clout's Come Home Again*. F.'s own works include *The Lamentations of Amintas for the Death of Phillis*, 1585, a series of trans. which he reprinted in 1591 as *The Countess of Pembroke's Iyrychurch*, named after one of her residences; this was the first of a series continued by *The Countess of Pembroke's Emanuel*, 1591, a poem on the Nativity, Passion, and Resurrection; and *Amintas Dale*, 1592, a medley of poetry and prose somewhat on the lines of Sidney's *Arcadia*. F. also wrote *Victoria*, a Lat. comedy, and 2 prose treatises, *The Arcadian Rhetoric*, 1584, and *The Lovers Logic*, 1588.

Fraunhofer, Joseph von (1787-1826), Ger. optician, b. Straubing, Bavaria. His father was a glazier, and he was apprenticed to a glass polisher. In his leisure he studied mathematics and optics and at the age of 20 was making original

contributions to the design and construction of optical instruments. Together with Guinand he developed processes for the production of good optical glasses, thereby enabling larger telescope objectives to be made, culminating in the 24.4-cm. diameter Dorpat Refractor. He devised the simple spectroscope and used the dark lines in the sun's spectrum, now known as F. lines, as fixed colours for the measurement of the dispersive powers of optical glasses. Wollaston had noticed 7 of these dark lines a few years earlier (1802), but F. first recognised their value and measured no less than 586 of them. In 1823 he was appointed prof. and conservator of the Cabinet of Natural Curiosities at Munich. See the *Optician*, pp. 535-40, 1951.

Fraunhofer Lines, fine dark lines crossing the solar spectrum, first observed by Wollaston in 1802, and later studied by Joseph von Fraunhofer (q.v.). The lines correspond to the wave-lengths of light absorbed in the reversing layer of the sun, i.e. the outer, cooler layers of gas.

Fraustadt, see WESZOWA.

Fraxinus, see ASH.

Fray Bentos, or Independencia, port of W. Uruguay, and cap. of Rio Negro. It is on the Uruguay R., about 170 m. NW. of Montevideo. The tn is engaged in the manuf. of extract of meat and in canning. Pop. c. 18,000.

Frazer, Sir James George (1854-1941), Scottish author, b. Glasgow; educ. at Glasgow Univ. and Trinity College, Cambridge. Elected to a Fellowship at Trinity College in 1879. At first his studies were classical, but he took a new line in 1887 with a book on *Totemism*. In 1890 appeared *The Golden Bough* (2nd ed. 1900; 3rd ed. in 11 vols., 1911; supplementary index vol., 1914; abridged form, 1922), which instantly brought him fame. This masterpiece of anthropology and scholarship has profoundly influenced the modern outlook on belief in the supernatural and on religious ritual. F. went to Greece for the preparation of an ed. of Pausanias, the Gk geographer, which appeared as *Pausanias's Description of Greece, translated with a Commentary* in 1898, 2nd ed. 1913, and *Pausanias and other Greek Sketches* in 1900. In 1907 he was appointed prof. of social anthropology to the univ. of Liverpool. He delivered his first Gifford lectures at St Andrews in 1911, choosing as his subject *Belief in Immortality and the Worship of the Dead*. In 1912 he ed. a selection of *Cowper's Letters* (with notes by J. E. Drayer). Knighted, 1914. O.M., 1925. Numerous honorary degrees. In 1920 he was elected a Fellow of the Royal Society, having given up his Liverpool Fellowship in 1919. His later work included a trans. of Apollodorus in the Loeb Library and an ed. of Ovid's *Fasts* in 5 vols. In 1929. With F. religious beliefs took their place among other natural phenomena as a subject for dispassionate investigation. His chief anthropological interest was the origin of religion, which in his view developed out of an early belief in magic, the simplest

primitives believing they could control nature by magic. Religious beliefs arose when men conceived of nature as a personal force to be propitiated by sacrifice. F. postulated a 3rd stage, when men control nature by scientific action. This view of man's past was developed at great length and in immense detail in many works. His influence to-day is waning amongst anthropologists, who have nevertheless been greatly affected by it. His other works include *Lectures on the Early History of the Kingship*, 1905, *Adonis, Atis, Osiris: Studies in the History of Oriental Religion*, 1906, 3rd ed. 1914, *Questions on the Customs, Beliefs, and Languages of Savages*, 1907, *Psyche's Task*, 1909, *Totemism and Exogamy*, 1910, *The Relief in Immortality*, etc., 1913, *Essays of Addison* (ed.), 1915, *Folklore in the Old Testament*, 1918, *The Worship of Nature*, i., 1926, *Myths of the Origin of Fire*, 1930, *Aftermath: a Supplement to the Golden Bough*, 1936, *The Fear of the Dead in Primitive Religion*, 1936, *The Gorgon's Head*, 1937, and *Totemica: a Supplement to Totemism and Exogamy*, 1937.

Frazer Island, or **Great Sandy Island**, see FRASER ISLAND.

Fréchet, Louis Honoré (1839-1908), Fr. Canadian poet, b. Lévis, Quebec. He was called to the Canadian Bar (1864), but entered upon a journalistic career in Chicago. In 1874 he was elected to the Dominion Parliament, but was defeated at the election of 1878. He ed. *La Patrie*, made sev. trans. from the Fr., and wrote *Mes loisirs*, 1863, *La Voix d'un exilé*, 1867, *Les Oiseaux de neige*, 1880, and the 2 historical dramas, *Papineau*, 1880, and *Félix Pontre*, 1880. His verse was sev. times crowned by the Fr. Academy. He was elected president of the Royal Society of Canada. See M. Dugas, *Un Romantique canadien: L. Fréchet*, 1934.

Fredegond, Fredegunde, or Fredegunda (c. 545-97), Frankish queen, first mistress and then wife of Chilperic, king of Neustria. She parted Chilperic from his first wife, Audovera, whose servant she had been, but he then married Galsvintha. F. was suspected of murdering her in the same year (567), and became her successor. This caused war between Chilperic and his brother Sigebert of Austrasia, whose wife, Brunhilda, was sister to Galsvintha. F. had Sigebert assassinated at Vitry (575), and made away with all who stood in the way of the succession to the throne of her own son, Clotaire II. After the murder of Chilperic in 584, she carried on war against Brunhilda and her descendants, but failed to kill the queen, and d. during the campaign.

Fredericia, seaport of Denmark, on the SE. coast of Jutland, at the N. entrance of the Little Belt and the Little Belt bridge. It has iron and silver works, manufs. chemicals, condensed milk, soap, and toys, is an important railway centre, and has considerable shipping trade. The prin. exports are meat, fish, and eggs; it imports pottery, salt, and petroleum. The permanent buildings of the Dan.

Industries Fair are situated here, and so is a college for the deaf and dumb. It has had an exciting hist. The fortress was stormed by Swedes in 1657. In 1849 the Dan. garrison broke a siege by the army of Schleswig-Holstein, but in 1864 the tn was evacuated by the garrison after bombardment and siege by the Austrians. Pop. 27,910.

Frederick I (c. 1122-90), Holy Rom. emperor, 1152-90, surnamed **Barbarossa** or **Redbeard**. He was the son of Frederick II of Hohenstaufen, duke of Swabia, and succeeded his father as duke of Swabia in 1147, and his uncle Conrad III as king of Germany in 1152. He reduced Germany to order during the early years of his reign, and then proceeded to establish the imperial authority in Italy. At Pavia he received the Lombard crown, and in 1155 was crowned emperor in Rome by Adrian IV. Four years later began the bitter contest between F. and Alexander III, Adrian's successor. In the course of this N. Italy was ravaged, F. excommunicated, and finally decisively defeated by the Lombard League at Legnano (1176). The following year he made his peace with the pope, and was able to turn his attention to Germany, where he had to struggle against Henry the Lion, duke of Bavaria and Saxony, head of the house of Guelph. In 1189, having settled the affairs of the empire and estab. universal peace in his dominions, he resigned the gov. to his eldest son, Henry, and put himself at the head of a crusade. He won 2 great victories over the Muslims, but was drowned in Cilicia in 1190. In Germany F. encouraged the growth of tns and took strong and successful measures to establish order. He is popularly remembered as a just and benevolent ruler: but his disastrous lt. campaigns did much to weaken the empire and impoverish its ters. See R. Wahl, *Kaiser Friedrich Barbarossa*, 1941.

Frederick II (1194-1250), Holy Rom. emperor, son of Henry VI and Constance, heiress of Sicily, and grandson of the Emperor Frederick I, thus a member of the Hohenstaufen family, b. near Ancona in Italy. On his father's death he was crowned king of Sicily at Palermo (1198), and on the death of his mother in the same year, Pope Innocent III became his guardian and regent of Sicily. He was elected head of the Holy Rom. Empire in 1212 on the excommunication of Otto IV, and his coronation took place in 1215 at Aix-la-Chapelle. Three years later, on the death of Otto, F. became undisputed ruler of Germany. In 1228 he went on a crusade, and set sail for Palestine, and by a treaty secured the possession of Jerusalem, Bethlehem, Nazareth, and the surrounding neighbourhood, crowning himself king of Jerusalem. During his absence Pope Gregory IX had devastated his possessions in Italy, but F., on his return, had no difficulty in driving back his enemies, and a peace was made between pope and emperor at San Germano (1230). In the last few years of

his reign, however, serious rebellions broke out against F. in both Germany and Italy. He was decisively defeated at Parma, 1248, and when he *d.* his ters. were in open revolt. See life by E. Kantorowicz, 1931; G. Masson, *Frederick II of Hohenstaufen*, 1957.

Frederick III (1415-93), Holy Rom. emperor, *b.* Innsbruck in the Tyrol, son of Ernest of Hapsburg, duke of Styria and Carinthia. In 1440 he was chosen Ger. king at Frankfurt under the title of Frederick IV, and in 1463 he united Upper and Lower Austria under his rule, taking the title of Frederick V, archduke of Austria. He had been crowned emperor at Rome in 1452, the last emperor to be crowned there. During his reign Hungary and Italy were invaded by the Turks, and Vienna was occupied by the Hungarians. The marriage of his son Maximilian with Mary, daughter and heiress of Charles the Bold, duke of Burgundy, made the Hapsburg family one of the greatest dynasties in Europe. F. was an incapable ruler, though he had a real love of learning, and towards the end of his reign handed over the gov. of his lands to his son Maximilian, retiring to Linz, where he passed his time in study.

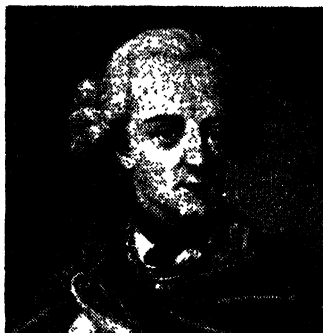
Frederick I (1369-1428), elector and duke of Saxony, surnamed 'the Pugnacious,' son of Frederick the Stern of Meissen. He won distinction as a soldier, and as a reward for his successes against the Hussites the Emperor Sigismund gave him the duchy of Saxony, 1423, and the title of elector. The Hussites crushed him, however, at Aussig 3 years later (1426).

Frederick III (1463-1525), surnamed 'the Wise,' elector and duke of Saxony, succeeded his father, Ernest, in 1486. He exercised an enormous influence on Ger. politics of the 16th cent. He founded the univ. of Wittenberg (1502), and called Luther and Melancthon to chairs in the faculty. He granted toleration to the creed of the reformers, though he never formally adopted it himself. On the death of Maximilian I he refused the offer of the imperial crown (1519). See P. Kirn, *Friedrich der Weise und die Kirche*, 1926.

Frederick I (1657-1713), 1st king of Prussia, elector of Brandenburg as Frederick III (1688-1701). He was the son of Frederick Wm, the great elector of Brandenburg. His name has become proverbial for vanity and extravagance, but he was a patron of learning, founding the univ. of Halle (1694) and the academy of sciences. F. supported the League of Augsburg against Louis XIV, and helped Wm III in the revolution of 1688 in England. Leopold of Austria granted him the royal title on the eve of the war of the Sp. Succession in return for his support.

Frederick II (1712-86), king of Prussia, known as 'the Great,' son of Frederick Wm I and Sophia Dorothea, daughter of George I of England. As a boy he was principally interested in music and literature: he detested the military

training his father forced him to undergo, and once made an unsuccessful attempt to escape to Paris. Before Frederick Wm's death, however, he and F. were reconciled. F. succeeded to the throne in 1740, inheriting the splendid army his father had collected but scarcely used. In the same year the emperor Charles VI (*q.v.*) *d.* F. immediately claimed Silesia for Prussia. When Maria Theresa rejected the claim, he invaded Silesia and in the first campaign gained the victory of Mollwitz. After the Prussian victory of Chotusitz, Austria in effect ceded most of Silesia to Prussia. Further fighting followed, but in 1745, by the treaty of Dresden, Austria relinquished all claims to Silesia. In 1756 the Hapsburgs formed an alliance against Prussia with



FREDERICK THE GREAT

Engraved by E. Scriven from a painting by Carlo Vanloo

France, Russia, Saxony, and Sweden, England siding with France. The resultant Seven Years War taxed Prussia's military strength and basic economy to the utmost. Despite Prussia's military superiority, she would probably have been defeated ultimately without Brit. subsidies. When it was over, F. devoted himself to the internal reconstruction of his country. Agriculture, industry, and trade were encouraged; the judicial system was reformed; communications and education were improved. F.'s own energy and capabilities were enormous; and at his death Prussia was not only vastly larger territorially, but stronger economically. In 1772 F. took part in the partition of Poland with Austria and Russia, and in 1779 an abortive campaign against Austria was ended through Russian mediation. Though he is remembered as a soldier and a politician of great dexterity and utter unscrupulousness, F. retained throughout his life his youthful interest in the arts and his passionate love of Fr. culture, though these were rigorously subordinated to his state duties. He corresponded frequently

with Voltaire. See T. Carlyle, *History of Frederick II*, 1858-65; H. Tuttle, *History of Prussia under Frederick the Great*, 1888; essay by Macaulay and lives by V. Thaddeus, 1930, and G. P. Gooch, 1947.

Frederick (1831-88), 2nd Ger. emperor and king (**Frederick III**) of Prussia (Mar.-June 1888), son of Wm I of Prussia (1st emperor of united Germany), and known as Frederick Wm before his accession. He studied at Bonn Univ., and travelled widely. He married Victoria, princess royal of England, in 1858 and became crown prince of Prussia on his father's accession, 1861. F. fought in the war with Denmark, 1864; in that with Austria, 1866, being present at the battle of Sadowa. In the Franco-Ger. war he fought successfully at Weissenburg, Wörth, and later at Sedan. He took part also in the siege of Paris. F. greatly influenced the founding of the new Ger. empire, though his views differed radically from Bismarck's. Had he ruled longer, his pronounced Liberal opinions might have had a considerable effect on Ger. hist: but he d. of cancer only 3 months after his accession. See life by S. Whitman, 1901. His diaries (*Tagebücher*), 1848-66, were ed. by H. Meisner, 1929. See also *The Empress Frederick Writes to Sophie*, ed. by A. G. Lee, 1955.

Frederick V (1596-1632), elector palatine of the Rhine, son of Frederick IV, whom he succeeded in 1610. He married Elizabeth, daughter of James I of England, in 1613, and was grandfather of George I. In 1619 F. headed the Ger. Protestant Union (Calvinists), and accepted the crown of Bohemia. F.'s gon. was utterly defeated by the Imperialists at the battle on the White Hill (near Prague), 1620, and he lost his hereditary possessions as well as Bohemia, and was obliged to go into exile. The electoral dignity was conferred on Maximilian of Bavaria, his cousin, the Catholic leader, in 1623. F. was father of Prince Rupert.

Frederick I (c. 1471-1533), king of Denmark and Norway, 1523-33. He succeeded his nephew Christian II. He was joint ruler of the duchies of Schleswig and Holstein with his brother John. During his reign the Lutheran faith took hold in Denmark and Norway.

Frederick II (1534-88), son of Christian III, and king of Denmark and Norway (1559-88). His reign falls into 2 distinct periods—that of war, 1559-70; that of peace, 1570-88. The war with Sweden lasted 7 years, ending in the triumph of F. at the peace of Stettin, by which time Denmark-Norway had become a great sea power.

Frederick III (1609-70), king of Denmark and Norway, son of Christian IV, becoming bishop of Bremen and Verden, 1634. He succeeded to the throne in 1648. Hoping to regain ter. lost by the treaty of Brömsebro, 1645, F. and his senate declared war on Charles X of Sweden, 1657. But Charles invaded Jutland and besieged Copenhagen, forcing the Dan. people to sign the unfavourable

treaty of Roskilde, 1658. The monarchy was made hereditary and absolute, instead of elective and limited, by a voluntary act of commons and clergy at a Diet, 1660-1.

Frederick IV (1671-1730), king of Denmark, from 1699, son of Christian V. He allied with Peter the Great and Augustus II, king of Poland, in 1700, against Charles XII of Sweden, but was forced to sign the peace of Travendal on the latter's siege of Copenhagen. During the reverses of Charles in 1709, F. again made war, capturing Stralsund and Tönningen. In 1720 F. concluded the treaty of Frederiksborg with Sweden. His reign was notable for numerous domestic reforms.

Frederick V (1723-66), king of Denmark. He succeeded his father, Christian VI, in 1746, and married a daughter of George II of England. A wise and able ruler, he did much to promote commerce, industry, and science. F. sent Niebuhr and others on a scientific expedition to Egypt and Arabia, 1761.

Frederick VI (1768-1839), king of Denmark and Norway, son of Christian VII. He became regent in 1784, owing to his father's insanity, and ascended the throne in 1808. His rule was marked by many internal reforms, including the abolition of serfdom in Denmark and Schleswig-Holstein. But in 1800 Denmark joined the armed neutrality of the N. against England. This caused hostilities with the Brit., resulting in the bombardment of Copenhagen by Nelson and the capture of the Dan. fleet (1807). F. allied with Napoleon, 1808. In 1814 Norway was taken by the allies from Denmark and given to Sweden under Bernadotte.

Frederick VII (1808-63), king of Denmark, son of Christian VIII, whom he succeeded in 1848. The chief events of his reign were the wars arising out of the revolt of the Schleswig-Holstein duchies against a common constitution with the kingdom of Denmark and the separation of Schleswig from Holstein. In 1849 F. signed the democratic constitution which has been the basis of political life (though somewhat amended by the constitution of 1953) ever since. He was the last of the Oldenburg line of Dan. kings.

Frederick VIII (1843-1912), king of Denmark, son of Christian IX, succeeded his father in 1906. He married Princess Louise of Sweden in 1869, and his eldest son, Christian, was b. in 1870. His second son, Charles, became king of Norway in 1905, under the title of Haakon VII. F. worked for the creation of a common policy for the Scandinavian kingdoms.

Frederick IX (1899-), king of Denmark, succeeded his father Christian X in 1947. He married Princess Ingrid of Sweden in 1935, and has 3 daughters of whom the eldest, Princess Margrethe (b. 1940) is heir-presumptive to the throne. In 1917 he joined the Royal Dan. Navy as a rating and attained the rank of captain in the normal course. Later he was promoted

in accordance with his increasing responsibilities as crown prince, and is now, as king, commander-in-chief of his navy, as well as of his army. At 18 F. became a member of the State Council (consisting of the king and his responsible ministers), and for sev. periods before, but chiefly during the Ger. occupation of Denmark, he acted as regent. He has travelled widely, having visited Iceland and Greenland, the Far East, and, with his wife, the United States and Canada in 1939. F. and his queen made a State visit to London, 1951; and welcomed Queen Elizabeth II and Prince Philip on a State visit to Denmark in 1957. F. is an ardent lover of music and himself an accomplished conductor, having often played with the Royal Theatre orchestra, Copenhagen.

Frederick (1676-1751), king of Sweden, 3rd son of the Landgrave Karl of Hesse-Cassel. In 1715 he entered the Swedish service, and on the resignation of her claims to the throne of Sweden of his wife, Ulrica Eleonora, sister of Charles XII, he became king (1720).

Frederick, co. seat of F. co., Maryland, U.S.A., 41 m. W. by N. of Baltimore. It is the seat of Hood College and a state school for the deaf. The manufs. include brushes, clothing, electrical apparatus, pumps, and household hardware; there are railroad shops, meat-packing plants, a canning industry, and a limekiln. There is also an airport. Pop. 18,140.

Frederick Augustus I (1750-1827), king of Saxony, son of the elector Frederick Christian, b. Dresden, becoming elector in 1763. In the Bavarian Succession war he sided with Frederick the Great against Austria, and afterwards joined the league of Ger. princes. In 1806 he joined Prussia against France, but concluded a treaty of alliance with Napoleon after the battle of Jena, and during the subsequent wars of Napoleon he was a faithful ally of the emperor. As a result Saxony lost much ter. at the end of the war. F. A. had taken the title of king in 1806. He attempted many internal reforms, both before and after the Napoleonic wars.

Frederick Charles of Prussia (1828-85), Ger. soldier, nephew of the Emperor Wm I, known as the 'Red Prince' because of the uniform he usually wore. He was educ. at Bonn, and then entered the army, serving with distinction in the first Schleswig-Holstein war in 1848. He also took part in the Austrian war of 1866, and the Franco-Ger. war (1870-1), where his leadership was conspicuous. He did a great deal to improve the Prussian Army, co-operating with Moltke in this.

Frederick Louis, Prince of Wales (1707-1751), eldest son of George II and Queen Caroline. In 1736 he married Augusta, daughter of Frederick, duke of Saxe-Gotha, and had sev. children, the eldest afterwards becoming George III. Frederick was always on bad terms with his parents and, forbidden the court, became the patron of the opposition to George II and Walpole. See life by A. Edwards, 1947.

Frederick William (1620-88), elector of Brandenburg, known as the 'Great Elector,' and son of the elector George Wm, b. Berlin. He was educ. at the univ. of Leyden. On his father's death in 1640 he became ruler of Brandenburg and Prussia (obtaining full sovereignty of the latter in 1657), and immediately set himself to repair the damage wrought during the Thirty Years War, still in progress. In 1648, by the treaty of Westphalia, the area of his dominions was much increased, and in the course of 10 years, with the help of able generals, he had created an army of 27,000 men, organised on the Swedish model. He reorganised the univs. of Frankfurt and Königsberg, and founded the univ. of Duisberg and the Royal Library at Berlin. He improved communications, reformed taxation, and introduced a postal system. He encouraged the immigration of Huguenots who brought their culture and industries to his country, and, though a Calvinist himself, gave toleration to Catholics and Jews. He greatly enlarged and beautified Berlin, leaving a large exchequer, a thoroughly well-organised army, and a developed civil administration. One of his final acts was to urge and back Wm of Orange's Eng. expedition. He ruled autocratically, curtailing the power of prov. assemblies, etc., but his internal rule, though despotic, was benevolent. His foreign policy was totally unscrupulous, based exclusively on a desire for his country's aggrandisement. A Fr. observer called him 'le plus fin renard de l'Europe.' He, not Frederick the Great, was the real founder of the Hohenzollern tradition, the Prussian State, and therefore of Germany, 1870-1945. See A. Waddington, *Le Grand Electeur*, 1905; and F. Schevill, *The Great Elector*, 1948.

Frederick William I (1688-1740), king of Prussia, son of Frederick I and father of Frederick the Great. He was passionately fond of military exercises; but though he formed a large, well-disciplined army, he did not engage in any very important wars. In 1720 he won from Sweden the dist. of Pomerania between Rs. Oder and Peene, including Stettin, Wollin, and Usedom ls. He founded a splendid administrative system, promoted trade, estab. a medical college, and various useful institutions in Berlin, and left a powerful and wealthy kingdom and splendid military machine to his son and successor.

Frederick William II (1744-97), king of Prussia, b. Berlin, nephew of Frederick the Great, whom he succeeded in 1786. In 1792, with Austria, he fought a desultory war against the Fr. rep. which lasted till 1795, resulting in the cession to France, by the treaty of Basel (1795), of the Prussian ters. W. of the Rhine. By the partition of Poland, in which F. W. shared, Prussia received large accessions of ter. During F. W.'s reign, owing to his indolence and lack of political capacity, Prussia's status generally declined. He was devoted to the arts, Beethoven and Mozart enjoying his patronage, but was

easily dominated by unsatisfactory favourites who shared his pseudo-mysticism. See G. Stanhope, *A Mystic on the Prussian Throne*, 1912.

Frederick William III (1770-1840), son of Frederick Wm II, *b.* Potsdam. He became king of Prussia in 1797. In 1806 he was overthrown by Napoleon at Jena and Auerstadt, and on the annihilation of the Prussian Army, the Fr. overran the kingdom. The Russian armies then advanced to the aid of Prussia, but were overthrown by Napoleon at Friedland (1807), leaving Prussia at the mercy of the conqueror. The treaty of Tilsit completed the ruin of Prussia, and during the next few years she remained almost defaced as a European power. At the beginning of 1813, however, the Germans rose against France, and F. W. entered into an alliance with Russia and Austria, and the allies overthrew Napoleon at the battle of Leipzig. At the Congress of Vienna, Prussia regained her lost ter. F. W. did something to advance the material welfare of his realm, but viewed all liberal political tendencies with suspicion.

Frederick William IV (1795-1861), king of Prussia, son of Frederick Wm III. He began his reign (1840) with sev. liberal measures, but was vacillating and indecisive, with a marked tendency to mysticism. There was a revolutionary outbreak in Prussia and Berlin, 1848, and F. was forced to grant a constitution to his people. In 1849 he declined the offer of the imperial crown by the Ger. National Assembly at Frankfurt, thus postponing Ger. unification for 13 years. He later carried out limited reforms in his own ters. Owing to insanity F. resigned the control of affairs to his brother Wm., 1858, and was succeeded by him as Wm I in 1861.

Frederick William (Friedrich Wilhelm Victor August Ernst) (1882-1951), ex-crown prince of Germany, eldest child of ex-Emperor Wm II (q.v.), *b.* Potsdam. He held nominal commands, but showed little military aptitude, during the First World War. After the war he fled to Holland, but returned to his Silesian estate in 1923. He later supported the Nazis but took no positive part in the Second World War. After the war he lived at Sigmaringen, then in the Fr. zone of occupation.

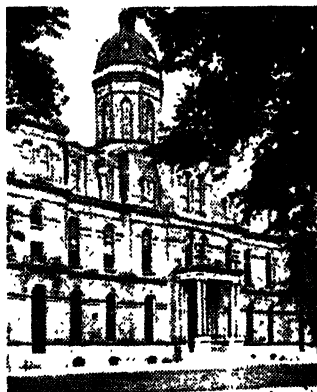
Fredericton, cap. of the prov. of New Brunswick, Canada, on the St John R. It was originally called St Anne's Point. It is an educational centre, with the univ. of New Brunswick and a teachers' college, and there is an Anglican cathedral. It has 3 shoe factories, a boat and canoe factory, 2 woodworking factories, and is the centre of a large dairy industry and a lumber industry. The prov. parliament buildings and prov. gov. offices are also situated at F. F. is served by Canadian National and Canadian Pacific railways, and has a municipal airport. New Brunswick military H.Q. and the Royal Canadian Mounted Police H.Q. for New Brunswick are at F. Pop. 16,020.

Frederiksberg, tn in Denmark, a residential suburb to the W. of Copenhagen. It has a military academy. Pop. (1955) 117,780.

Frederiksberg: 1. Amt in NE. Zealand, Denmark, on the Cattegat and the Sound. Area 520 sq. m.; pop. 162,800.

2. Dan. royal castle built in 1602-20, situated about 20 m. NNW. of Copenhagen. It was destroyed by fire in 1859, and, after being restored (1864-71), was used as an historical museum.

Fredericksburg, tn of Spotsylvania co., Virginia, U.S.A., situated on the Rappahannock R., about 55 m. SSW. of Washington. The riv. affords great water power, the tide ascending as far as F. F. manufs. footwear, clothing, food



PARLIAMENT BUILDING, FREDERICTON

products, cellophane, and furniture. It is a trade centre in an agric. and dairying area. During the Amer. Civil war a battle was fought here, in which the Union forces under Burnside were defeated by the Confederates (1862). Pop. 12,158.

Frederikshald, see HALDEN.

Frederikshavn, seaport of N. Jutland, Denmark, on the Cattegat, 36 m. NE. of Aalborg. It has an excellent harbour, free from ice throughout the year. It is protected by the citadel, Fladstrand, which formerly gave its name to the tn. It has considerable trade in dairy produce. Prin. exports are fish and oysters. There is a regular steamship service running to Sweden, Copenhagen, and England. Pop. 20,020.

Fredeswita, St. see FRIDESWIDE, St.

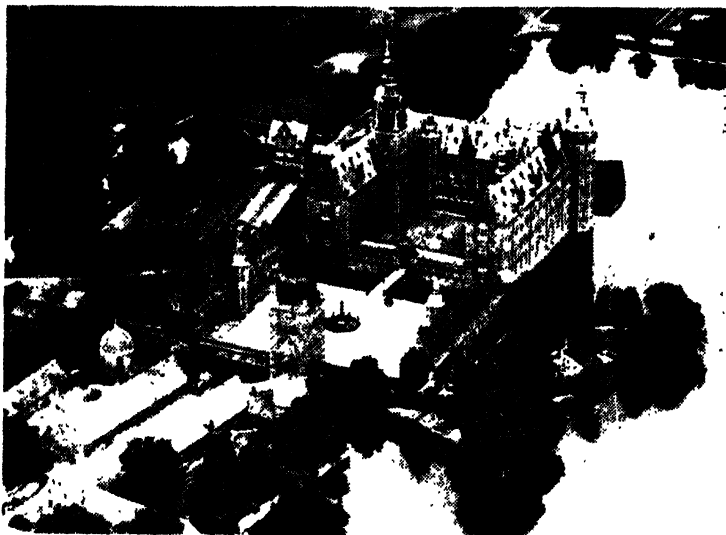
Fredrikstad, seaport of Norway, in Østfold co., at the mouth of the Glomma, 58 m. by rail SE. of Oslo. It exports timber, pulp, and paper, and has ship-building, whale-oil refining, and canning works. Pop. 14,000 (with suburbs, 40,000).

Free-alms, see FRANK-ALMOIGNE.

Free Church Federal Council (F.C.F.C.), formed in 1940 by the union of the Free Church Council (estab. 1892) and the Federal Council (estab. 1919). To it are sent representatives from the Presbyterian, Congregational, Methodist, and Baptist Churches. The F.C.F.C. takes action when necessary on behalf of the federated Churches. The monthly magazine, ed. for the F.C.F.C., is entitled the *Free Churchman*. The H.Q. of the Council are at Tavistock Square, London, W.C.1.

Free Church of England, small sect which broke away from the Estab.

Standards of the Church of Scotland as heretofore understood, that is to say the Westminster Confession and the Longer and Shorter Catechisms, but in 1892 the binding force of these was somewhat modified by a Declaratory Act, which classed some parts of the confession among things not to be considered as literally binding. This is quite in accordance with the Free Church Catechism issued soon after the disruption, in which the right of a Church to alter its creeds and formularies without State sanction is reckoned as one of the essentials of its freedom. The disruption was caused



Royal Danish Ministry of Foreign Affairs, Copenhagen

FREDERIKSBORG CASTLE AT HILLERØD, NORTH ZEALAND

Church in 1844, as a protest against the influence of the Tractarian or Oxford movement. It maintains the episcopal organisation, and claims to have retained the apostolic succession. It is, however, strictly Protestant in doctrine, and seeks to promote evangelical and Reformation principles. Its first church was formed at the vil. of Bridgetown in Devon by the Rev. J. Shore. Its numbers are extremely limited. Gov. is carried on by an ann. convocation.

Free Church of Scotland, body of Scottish Presbyterians who at the 'Disruption' of the Church of Scotland in 1843 separated from the Estab. Church. It claimed, however, and still claims, to be the historical continuation of the National Church which was set up in 1560. It retains the 'Confession of Faith and the

generally by an entire difference of opinion on the whole question of estab. and the authority of the State over the Church. The proximate cause, however, was the question whether a minister could be forced on an unwilling congregation. It is important to recognise that the leaders of the Free Church party in 1843 did not condemn all union of Church and State, but only such as infringed the Church's right of self-gov., committed to her by Christ Himself, of whom the Westminster Confession declares 'the Lord Jesus, as King and Head of His Church, hath therein appointed a government in the hand of Church officers, distinct from the civil magistrate.' Since the 1888 revolution, however, the union between Church and State had been such that all of these eccles. regulations had been made

part of the statute law. A case had arisen in which a minister presented to a living had been rejected by the congregation, and in 1834 the General Assembly passed the Veto Act declaring it to be a fundamental law of the Church that no pastor should be intruded on any congregation contrary to their will. In 1838, however, in the Auchterarder case, the court of session decided in favour of the presentee, and in the next year the case came before the House of Lords. Here the civil power showed but scant respect for the Church's eccles. jurisdiction, and definitely stated the supremacy of the statute law in all cases, denying in fact that it is even possible that there should be such a thing as a conflict between the civil law and the eccles. courts of an estab. Church. In 1842 the General Assembly formally refused to enter on the course of action which the recognition of this principle would involve, and threatened a separation from the State. In 1843 an attempt was made to secure a parl. inquiry, but this failing, at the meeting of the General Assembly (18 May 1843) the major part of the Assembly made their protest and quitted St Andrew's church. They proceeded to Tanfield Hall, Canonmills, and there was held the first Free Church Assembly, with Dr Thomas Chalmers in the chair. By 23 May 474 ministers had resigned their benefices, homes, and incomes, and trusted themselves entirely to voluntary support. The financial system was organised quickly and most successfully, and a central sustentation fund furnished a reasonable income for all ministers. A committee was formed in 1863 to consider the proposal of alliance with the United Presbyterians, but the refusal of the Free Church to give an unqualified condemnation of estab. made it impossible. The proposals, however, were continually renewed, and on 31 Oct. 1900 union between the two was finally completed at Edinburgh, the newly formed body bearing the title of the United Free Church. A small body refused to accept this union, and claimed to be the continuation of the old Free Church. It therefore claimed the possession of all its emoluments, and the House of Lords decided in favour of the small body. The impossible nature of the decision was immediately apparent and an Act of Parliament in 1905 altered this position. A div. of the property, etc., between the 2 bodies was made by a Royal Commission. To-day the F.C. of S. is quite a small body, strongest in the highlands, and commonly known as 'Wee Frees.' The union of the Church of Scotland with the United Free Church of Scotland was effected at a joint meeting of the General Assemblies of both Churches on 2 Oct. 1929. Prior to this union of 1929, Scotland was divided into 16 synods and 66 presbyteries. There have since been added the presbytery of England and the presbyteries of N. Europe, S. Europe, Spain, and Portugal, and a number of Indian and colonial presbyteries, making a total of 84. The

number of communicants on the roll (31 Dec. 1928) was 759,797, and in 1955 the number was 1,307,573. The supreme court is the General Assembly, which meets annually, in May, synchronously with the meeting of the General Assembly of the Estab. Church and of the remanent F. C. of S. See also SCOTLAND, CHURCH OF. See C. G. MacCrie, *Church of Scotland, Divisions and Reunions*, 1901; W. L. Mathieson, *Church and Reform in Scotland*, 1916.

Free Churches, general name given to all those Protestant Christian bodies of England and Wales which are not estab. by the State. They include not only the large group which forms the Free Church Federation, but also many others not thus associated. The point in common between all these bodies is implied in the title. All hold that permanent union between Church and State is impossible, since it leads to the State imposing laws on the Church, and that, therefore, the two should exist separate, the Church being free to make its own rules and carry on its own system of gov. in matters spiritual. Most of the F. C. are democratic in form, and the governing body has the power of changing the conditions of membership, deciding on corporate expressions of faith, etc.

Free Exchange. A paper £ not convertible into gold would exchange for what it was worth from day to day—the rate at any time depending on the number of pounds actually and prospectively on offer and demand. Features of such a F. E. are: (1) F. E. acts as a sort of tariff. If we over-import, the exchange goes against the £ and so discourages imports and encourages exports. This is what is wanted and the remedy has the advantage of being automatic and immediate. (2) The brunt of the adjustment is borne by buyers of foreign goods whereas the brunt of Gold Standard adjustment tends to fall on the internal economy through lower prices. (3) We retain budgetary freedom: we can decide on deficit financing in pursuit of full employment; and we can aim either at a stable £—buying always about the same amount of goods—or a £ which will buy more goods as science and machinery increase production. Under a Gold Standard a nation's freedom to indulge in deficit financing is limited, and it must 'keep in step' as regards what its unit will buy: it must be careful to avoid any risk of inflation as distinct from reflation. (With a universal currency a nation loses all budgetary freedom. Universal currency—i.e. a single currency for the whole world—has an attractive sound and is to-day being suggested as a cure for our currency and trade troubles. A European currency is an alternative suggestion with similar advantages.) The 1914 war forced Britain off the Gold Standard (along with other nations), although formally the break did not come until 1919. A paper currency was introduced and, since the heavy war expenditure was covered only in part by tax and loan, the number of £s steadily increased

—the value of each £ decreasing of course as the total issues rose. Had it been practicable to pay the full costs of the war by means of taxation and savings the paper £ could have retained its full value. In fact the value of gold itself had fallen in May 1920 to 40 per cent of its 1913 value. It rose steeply soon after.

The word 'profiteering' will recall the high prices that prevailed after the First World War; but the gradual increase in goods aided by a deflationary policy raised the value of the £ until in 1925 it could 'look the dollar in the face,' and Britain returned to the Gold Standard but not to a gold currency, i.e. to a Gold Bullion Standard. This was in line with the recommendations of the Genoa Conference of 1922. Assuming the wisdom of an early return to the Gold Standard it remains a question whether it was wise to have imposed deflation with all its dread effects on trade, and whether instead of making the £ look the dollar in the face it would not have been better to have reduced its gold content. It was generally accepted that after 1925 our trade was labouring under the handicap of an over-valued £. Relief was to come in the 'economic blizzard' of 1931-2 when Britain was forced off the Gold Standard after making the most strenuous efforts to avoid that contingency. No sooner were we off the Gold Standard (21 Sept. 1931) than it was discovered that exchange freedom has its compensations; in particular it was found that our main suppliers were most anxious to continue to supply their best customer and were prepared to accord us the most favourable terms rather than lose their traditional market. The freeing of the exchange was soon followed by an expedient which bid fair to give us the best of both worlds: the Exchange Equalisation Account was estab. This provided a fund to steady the exchange by ironing out minor fluctuations. It seemed to offer the quick 'natural protection' of the F. E. with as much steadiness as was permitted by underlying conditions. In fact, the E.E.A. perhaps aimed rather at holding the rate than at merely ironing out temporary fluctuations. In 1936 came the Tripartite Agreement with the U.S.A. and France, aimed at maintaining the basis of international exchange. France was one of the few countries still on gold after 1931 but was finally forced off in 1936 (following the enactment of the 40-hr week), its trade having grievously suffered from the franc's over-valuation. The U.S.A. had itself in 1933 deliberately devalued the dollar—the oz. of gold making \$35 instead of only \$20.67. Meanwhile Hitlerite Germany was manipulating its exchange to provide marks at different rates according to the purpose for which they were to be used.

The Second World War broke out in 1939 and soon led to the pegging of the leading currencies—the £ at \$4.03. It had been pegged in the First World War at \$4.76 (falling afterwards below \$3.50), but much had happened since, includ-

ing the dollar devaluation. Again, the nations failing to pay their way with taxation and savings, the end of the war found all the participants with depreciated currencies in terms of goods. The £ declined to 4/7 of its pre-war value, as measured by wholesale prices. The Cost-of-Living Index did not measure the fall in value since many of the prices were controlled and subsidised. After the First World War Britain began raising the value of the £ and after much effort and many changes in Bank Rate succeeded in restoring the Gold Standard. After the Second World War the position was very different and was dominated by the International Monetary Fund (I.M.F.). Bank Rate was kept at the 'cheap money' rate of 2 per cent until Nov. 1951, and the £ continued (under the I.M.F.) to be pegged at \$4.03, until 1949 when it was devalued to \$2.80. The I.M.F., whose main purpose is to keep exchange rates stable, or reasonably stable, requires every member country to fix the par value of its currency in gold, or gold dollars. The I.M.F. is clearly inspired by the Gold Standard, but, with its machinery for co-operative action, is far removed from the old Gold Standard system, with each country managing its own affairs albeit with regard to the 'rules of the game.' In the past, while all Gold Standard nations might be faithfully keeping in step, the value of gold itself might be unstable—might be going up or down—with good or bad results. Under Article IV, Section 7, the I.M.F. should be able to counter this outstanding defect in the old system. The I.M.F. aims at sustained national incomes all round and its machinery is there both to reduce the need for internal adjustments and to cushion them when inevitable. In the old days unemployment was often the adjusting factor for an over-valued currency, and if the I.M.F. plays a major part in promoting less harsh methods of adjustment it will have deserved well of mankind. Adjustment there must be. No country can go on indefinitely living beyond its means. Equally, no country can, without serious effects on world trade, go on living below its means unless it is prepared to give away the surplus, and that promptly. When it was estab. in 1946, the I.M.F. envisaged a return to the Gold Standard by 1951, each country maintaining the gold value of its currency and making it freely convertible into other currencies. The U.K. made tentative approaches to convertibility, but by early 1958 full convertibility had not yet been estab. See also GOLD STANDARD; INTERNATIONAL MONETARY FUND.

Free Imperial Cities. The *Freie Reichsstädte* of Germany were those medieval towns which enjoyed either complete or partial autonomy. They may in their constitution be compared to the chartered towns of medieval England, the free towns of Spain (*see* FUERO), and the Italian republican cities of the same period. In all or most of these cases the anomaly of such an *imperium in imperio* was due to the

wealth and influence early acquired by tns through industry and commercial relations, and consolidated by defensive leagues like the celebrated confederacy of the Hanseatic League. The number of F. I. C. varied from time to time by reason of the struggle to maintain their privileges in the teeth of eccles. and secular opposition and royal jealousy. Mainz, the head of the Rhine confederated tns, was transferred to the episcopal see in the middle of the 15th cent., while Chemnitz and certain other tns of the Hanseatic League were later taken by the dukes of Saxony. Others were shorn of their privileges by successive emperors, and yet others were conquered by foreign enemies. At the end of the 18th cent. they numbered about 50, divided into 2 benches, the Rhenish and Swabian, as 2 integral members of the Diet. At the beginning of the 19th cent. only 6 possessed any measure of independence, some having been assigned to France while the rest were deprived of privileges of which they had long since ceased to retain anything but the shadow. By the terms of the Ger. confederation only Hamburg, Lübeck, Bremen, and Frankfurt were recognised as F. I. C., but the privileges which the first 3 long preserved were, in later times, of no greater importance than those of various bors. in England. See *The German Free Cities*, 1914.

Free-lances, roving companies of knights and men-at-arms, who wandered about to different states selling their services to any lord who was anxious for aid in the constant feuds of the Middle Ages. They became most famous in Italy as *condottieri*. In Germany they were represented by the *Landsknechte* (land-troopers), mercenary foot-soldiers raised by Maximilian I in 1487. *Landsknechte* were the men of the Austrian lands as opposed to the Swiss mountaineers, but are commonly confused with *Landsknechte* (lance-troopers). They won fame in the 15th and 16th-cent. wars, but after the Thirty Years War fell into disrepute. The term is now applied in general to all who own no fixed party allegiance, or follow the methods of no particular school, but act independently (and sometimes capriciously).

Free Libraries, see PUBLIC LIBRARIES.

Free Lovers, see BIBLE COMMUNISTS and PERFECTIONISTS.

Free Port (It. *porto franco*), a port or a zone in a port where goods may be landed, manufactured, and reshipped without intervention by the customs authorities or payment of the usual customs duties. The purpose of such a port or zone is to allow speedier consignment and reshipment of commodities. If, however, commodities are admitted for consumption within the country wherein the F. P. or free zone lies, they are liable to the customs duties of that country. The practice derives from the Middle Ages, when the existence of so many small states, each with its own trading laws, hindered trade, and certain

cities were permitted to grant to foreign merchants trading zones wherein they enjoyed virtual free trade in many commodities. Some of the great Hansa tns (see HANSEATIC LEAGUE), Hamburg, Bremen, and Lübeck, were among the first to grant such privileges.

With the rise of the mercantile system (q.v.) and its correlative practice of erecting tariff barriers, the strangulation of trade was such that it was found necessary to extend the F. P. system. Such was the case of Leghorn, which was followed later by other It. cities. With the resurgence of nationalism in the 19th cent. the existence of these extra-territorial areas was often an embarrassment to the govts. concerned, and, moreover, tns without such facilities complained of the unfair advantages of the F. P.s. with the result that many lost this status or were reduced to zones within ports. An important consequence was the introduction of the bonded warehouse (q.v.) system. The prin. F. P.s in Europe are Copenhagen (1894), Hamburg, and Gdansk (Danzig, 1898), and in Asia Singapore and Hong Kong. There are none in the U.K., and in the U.S.A. the only F. P. zone is on Staten Is., New York Harbour.

Free Reed, see REEDS.

Free Soil Party, The, name given to a political anti-slavery party in U.S.A., formed in 1848, which lasted till 1854, and then became one with the Republican party. It nominated Van Buren for the presidency, but he was defeated in 1848. It was really a combination of the political abolitionists, many of whom had been formerly identified with the more radical Liberty party, with the Barnburners (q.v.) and the anti-slavery Whigs.

Free Trade, economic doctrine which advocates equality of treatment of all commodities for the purposes of taxation, whether produced at home or abroad. Taxes levied on commodities purely for revenue purposes, without differentiation between the home produce and imported goods, are no violation of this doctrine. F. T. was first advocated by Adam Smith (q.v.) in his *Wealth of Nations*, 1776. As the national wealth increases by allowing each individual freely to engage in that occupation most fitted to his capacity, and to exchange his product in order to procure whatever other commodities he requires, so the general prosperity of the world would be enhanced by each nation devoting itself to those branches of industry specially suited to it, and exchanging its commodities, without hindrance, with other nations. The question of trade is, however, regarded from a national and not a universal standpoint, and though it is seldom denied that universal F. T. would be advantageous, it is frequently held that from a national point of view the protection of some home industries is highly necessary. Free traders argue that under F. T. articles are bought at the cheapest prices and therefore produced in the most economical way.

involving saving of labour and capital. Moreover, as a country pays for its imports by its exports, to allow free importation is also to encourage corresponding production along other lines. Again, competition, by bringing the home producer into contact with foreign rivals, stimulates his commercial zeal and forces him to adopt every improvement of process. As a negative argument, it is urged that even though protection might theoretically be defensible, govs. are not sufficiently wise to apply it beneficially. The fact that protected countries have generally found it necessary to impose a constantly increasing tariff against foreign goods is held to prove that such tariffs do not act effectively.

The argument for protection is necessarily urged from a national point of view. It is alleged that a system of protection renders possible the perpetuation of those branches of industry which cannot withstand foreign competition, thus affording greater openings for home capital and labour, and also provides a means of raising revenue. These 2 claims are necessarily, to some extent, antagonistic, as the revenue would diminish in proportion to the cessation of foreign competition. It is also frequently stated that although F. T. is advantageous as a normal condition of industry, nevertheless, in certain circumstances, protection is justifiable. Thus, in a new country, protection is held to foster rising industries. Where a country possesses a limited stock of a valuable commodity, an export duty is advocated as a means of preventing its too rapid exhaustion. The contention is also made that a country which allows free imports is at a disadvantage in dealing with a country which does not do so. Hence the policy of retaliation, which has for its object the imposition of duties upon the goods of a certain country in order to force that country either to abolish or to reduce an unfavourable tariff. The dependence of Great Britain on foreign countries for its food supplies, which would prove prejudicial in case of war, and was demonstrated with unpleasant clearness in the First and Second World Wars, was held to be a reason for stimulating home food production.

Great Britain held to the system of F. T. from 1860 until 1932. A campaign was started in 1903 by Joseph Chamberlain, then colonial secretary, for imperial preference (q.v.), based on the necessity of preventing the alleged decline of Brit. trade, and at the same time uniting the colonies more closely to the motherland by mutual commercial interests. The latter part of the scheme involved the imposition of food taxes, which proved to be the least favoured part of the programme. The scheme was, however, accepted by the larger portion of the Unionist party, and gave rise to the fiscal controversy that animated Brit. political life from that date. The First World War necessitated a modification of Brit. F. T. policy, and in 1915 McKenna (q.v.)

imposed duties upon certain imported articles (including motor cars, cinema films, clocks, musical instruments, plate-glass sheets) in order to restrict demands made upon cargo space in vessels needed primarily for the transport of food. In 1917 the gov. agreed to a scheme of 'Imperial Preference within the Empire,' with special reference to 'Key Industries.' In 1921 a rebate of duty on empire goods was granted. In the same year the Safeguarding of Industries Act (q.v.) was passed. The return of the Conservative party to power in 1924 brought with it a mild system of imperial preferences, notably in favour of empire sugar, dried fruits, tobacco, and wine. The McKenna duties were abolished by the Labour Gov. of 1924, but the succeeding Protectionist Gov. reimposed them for a period of 5 years. In 1926 the duties on foreign cars were extended to commercial cars, and a duty was levied on imported artificial and natural silk. Light duties were also imposed on imported gas mantles, cutlery, and a few other articles. After the First World War protection was carried to great lengths in every country, with the result that Britain was placed at a considerable disadvantage. Finally, in 1932, Britain abandoned her time-honoured F. T. policy and adopted a medium-high protective tariff, food, however, being for the most part only lightly taxed, or allowed to enter free. But until the Second World War Britain's fiscal policy remained relatively temperate, and even the much criticised Ottawa agreements involved only a low tariff system.

Other pre-1914 F. T. countries were Belgium, the Netherlands, and the Scandinavian countries, all of which subsequently adopted moderate protective tariffs. Some reciprocal and mutually advantageous arrangements, directed to the substantial reduction of tariffs and other barriers to trade and the elimination of discriminatory treatment in international commerce, were made in the General Agreement on Tariffs and Trade at Geneva in 1947. The schedule to this agreement showed that, in spite of these relaxations, the world was far from being F. T.; and the wide variation in the amount of protection afforded to different commodities indicated that the duties reflected the fears and pressure of local producing interests. At the conference which resulted in this agreement the U.S.A., occupying the position that Britain occupied at the time of the industrial revolution as the world's workshop, was primarily concerned to push the idea of F. T. and tariff reductions. Britain, on the other hand, having lost the monopoly of manufactured goods and the economic leadership, was chiefly concerned to create openings for her export trade. The U.S.A., emerging from the Second World War with an enormous industrial output far beyond domestic needs, was so far ahead of every other nation in its exportable surplus that it was anxious that tariffs everywhere should be cut down—including Brit.

imperial preferences (though in the result 75 per cent of these latter were unaffected). Britain, moreover, owing to its peculiar dependence after the war on a flourishing export trade, stood to gain exceptionally from a revival of multilateral trading conditions, and so new interest was awakened in the concepts of F. T. For the time being, owing to currency difficulties, particularly the shortage of dollars, Britain supplemented or qualified to some extent these freer trading conditions by bilateral arrangements. *See also* EUROPEAN PAYMENTS UNION; GENERAL AGREEMENT ON TARIFFS AND TRADE; PROTECTION.

Bibliography. The F. T. position is given in F. Bastiat, *Sophismes économiques*, 1844-8; H. Fawcett, *Free Trade and Protection*, 1881; Sir T. H. Farrer, *Free Trade and Fair Trade*, 1885; B. R. Wise, *Industrial Freedom*, 1892; Francis W. Hirst (ed.), *Free Trade and Other Fundamental Doctrines of the Manchester School*, 1903. On the protectionist side, works to be consulted are Carey's *Principles of Social Science*, 1858-9, and the work of Friedrich List, the Ger. economist. Modern fiscal issues are dealt with in Deryck Abel, *A History of British Tariffs, 1923-42, 1945*; Sir Wm. Beveridge and others, *Tariffs: the Case Examined*, 1931; L. Robbins, *Economic Planning and International Order*, 1937; F. C. Benham, *Great Britain under Protection*, 1941; Wilhelm Röpke, *International Economic Disintegration*, 1942; J. B. Condliffe, *Reconstruction of World Trade*, 1951.

Free Trade Area, *see* EUROPEAN COMMON MARKET.

Free Verse, a pattern of verse structure without regular metre and usually without rhyme. It is difficult to draw a hard-and-fast line between F. V. and rhythmical prose. Walt Whitman, usually reckoned a pioneer in F. V., described his compositions, which took inspiration from the rhythms of the A.V. of the Bible, as 'free prose'; and Amy Lowell, one of the most successful modern users of F. V., preferred to call her work 'polyphonic prose.' F. V. dates back a considerable time, for Milton's *Samson Agonistes* is written in F. V., modelled on the rhythms of Gk classical drama, and Matthew Arnold followed his example in such poems as 'The Strayed Reveller.' In France *vers libre* was used in the 18th cent. by La Fontaine, and in 1862 Baudelaire pub. his *Little Poems in Prose*. The extensive use of F. V. dates from just before the First World War, when the Imagist group of poets (q.v.) resolved to abandon rhyme and concentrate on avoiding the hackneyed and seeking always the perfect phrase. They included T. S. Eliot, Amy Lowell, Hilda Doolittle, D. H. Lawrence, and Ezra Pound. The following lines by the last-named illustrate the type of verse and also describe the poet's point of view:

'Go, little naked and impudent songs.

Go with a light foot!

(Or with two light feet, if it please you!)

Go and dance shamelessly!

Go with impertinent frolic.'

F. V. was for long the mark of what may be termed revolutionary groups of poets—Vorticists, Dadaists, Cubists, Futurists, Surrealists—but later it was much more generally employed, especially in the U.S.A., where its users include Carl Sandburg, Wm Carlos Williams, Marianne Moore, Conrad Aiken, Archibald MacLeish, and E. E. Cummings. *See* separate articles on poets cited; also M. M. Dando, *Vers Libre*, 1922; Laura Riding and Robert Graves, *A Survey of Modernist Poetry*, 1927.

Free Will. Whether man is morally a free agent or whether his actions are predetermined by previous events beyond his control has always been a problem of philosophy. Descartes and Hume asserted the absence of contingency in human conduct, while Kant excepted the spiritual realm from the necessity which he observed in the material world. Later 19th-cent. philosophy, under the impulse of physical science, tended to deny human F. W., but at present it is admitted, albeit within a restricted field. St Augustine laid down the principle of F. W. as a fundamental belief of the Christian Church. The doctrine of absolute predestination, however, advanced by Luther and Calvin, exercised a powerful influence on Protestantism at the time of the Reformation. *See also* DETERMINISM; WILL.

Freebench, in Eng. law, the interest which a widow had in the copyhold lands of her late husband, so long as she remained unmarried. The amount to which she was entitled amounted in general to one-third of the lands held by her husband. F. was abolished by the Law of Property Act, 1925.

Freedom of a City, *see* BURGESS; FREEMAN; LOCAL GOVERNMENT.

Freedom of the Press, *see* PRESS.

Freedom of Speech, *see* PARLIAMENT; HOUSE OF LORDS; HOUSE OF COMMONS.

Freehold. A F. estate or interest in land may be strictly defined as an interest which may continue for the whole period of some particular life or lives, or else for some uncertain period included in such life, as, for example, during the time of widowhood, or until bankruptcy. The term necessarily comprises fee simple and fee tail estates or estates of inheritance, and indeed F.s are frequently divided into those of inheritance and not of inheritance, the latter being F.s for life. The term F. (*liberum tenementum*) comes from feudal times, and meant that the tenant held his land by some small services of an honourable as opposed to a base or servile kind. Such services are now long since abolished, and the only feudal incidents of a F. still surviving, or nominally surviving, are (1) escheat or devolution to the Crown on intestacy, there being no heirs; (2) an oath of fealty, never exacted; (3) relief, or a year's rent to the feudal overlord (if there is one) on succession to the deceased tenant; (4) a small chief or quit rent. There were also other F.s of an extraordinary or more

localised kind, viz. grand serjeanty (q.v.), petty serjeanty (q.v.), burgage tenures (q.v.), gavelkind (q.v.), and frank-almoign or tenure by spiritual services, such as saying prayers for the parishioners, which were abolished in 1925. At the present day F. is mainly regarded as merely the direct antithesis of a leasehold interest, a F. being necessarily an estate for a certain period of uncertain duration, while a leasehold interest is no more than one for a fixed term of years. The third prin. form of land-holding was that of copyhold tenure, which in its origin was a holding by villeins of a lord of a manor; copyholds were abolished in 1926. *See also* COPYHOLD; KNTAIL; ESTATE, etc.

Freeman, Edward Augustus (1823–92), historian, b. Harborne, and educ. at Trinity College, Oxford, of which he became a Fellow. His first books were *A History of Architecture*, 1849, *An Essay on the Origin and Development of Window Tracery in England*, 1850, and (with W. B. Jones) *History and Antiquities of St David's*, 1856. F.'s *The History of the Norman Conquest of England, its Causes and its Results*, 1867–76, is by far his most outstanding achievement, and is still widely read, although modern scholarship has suggested that F. placed too much emphasis on the Teutonic origins of Eng. institutions. He was regius prof. of modern hist. at Oxford from 1884 until his death. *See* W. R. W. Stephens, *The Life and Letters of E. A. Freeman* (with bibliography), 1895.

Freeman, John (1880–1929), poet, b. Dalston, Middx. At the age of 12 he left school to become a clerk in an insurance company, of which in 1927 he was secretary and director. His earliest books of verse were *Twenty Poems*, 1909, *Fifty Poems*, 1911, and *Stone Trees*, 1916. His *Poems New and Old* gained the Hawthornden Prize in 1920. After sev. more books of verse his *Collected Poems* appeared in 1928 and *Last Poems* after his death. He also wrote studies of George Moore (q.v.), 1922, and Herman Melville (q.v.), 1926. His *Letters* were pub. in 1936.

Freeman, Richard Austin (1862–1943), writer of detective stories, b. London. He studied medicine and in 1889 took part in an expedition to West Africa, of which he wrote in *Travels and Life in Ashanti and Jamaa*, 1898. In 1907 he pub. his first detective story, *The Red Thumb Mark*, and his detective, Dr Thorndyke became one of the most famous of fictitious investigators, even giving some ideas to the official force. Others of F.'s books are *John Thorndyke's Cases*, 1909, *The Eye of Osiris*, 1911, *The Great Portrait Mystery*, 1918, *Dr Thorndyke's Case Book*, 1923, *The Puzzle Lock*, 1925, *As a Thief in the Night*, 1928, and *When Rogues Fall Out*, 1932. In *The Singing Bone*, 1912, he used the innovation of describing the crime first, before showing how Thorndyke unravelled it. *See* DETECTIVE STORY.

Freeman, one who possesses the freedom of a city, bor., or company. Prior to the

Municipal Corporations Act, 1835, bor. freedom was regulated by the bor. charter. An admitted F. enjoyed many rights and privileges which varied in different bors. *Inter alia*, a F. generally had the parl. vote, immunity from co. jurisdiction, exemption from tolls, and a share in the revenue accruing from the corporate property. The Act of 1835 does not affect the rights of admitted freemen, and the following are still entitled to be entered on the Freemen's Roll and to enjoy the above noted rights except exemption from tolls, and in some cases share in revenues from corporate property: wife, widow, son, daughter, son-in-law of a F.; apprentices to freemen; and those who before the Act would have been entitled to be admitted, otherwise than by gift and purchase, the 2 latter modes of admission being now abolished. Bor. councils may also admit persons of distinction or persons who have performed eminent services for the bor. to be honorary freemen. Freedom of a city is tantamount to that of a bor. Freedom of the London livery companies is a survival of the guild-merchant system. There are 4 ways of acquiring the freedom of a company: (a) apprenticeship to a F. either of the company or of the City of London; (b) patrimony, i.e. by reason of being the child of an admitted F.; (c) gift (honorary); (d) redemption or purchase, usually limited to members of the guild trade. *See also* LOCAL GOVERNMENT.

Freeman-Thomas, Freeman, *see* WILKINSON, 1st MARQUESS OF.

Freemasonry, system observed by the secret associations of 'free and accepted masons.' Its origin has been traced to the time of the erection of the Tower of Babel, or to that of Solomon's Temple. More modest computations go no further than to place the introduction of F. into England in the 7th cent. and the foundation of the Grand Lodge at York in AD 926. Others allege that F. came into existence at the time of the crusades. But the most unbiased historians seem to concur in relating its origin to the purely utilitarian association of fellow craftsmen in a masons' guild or trade union. There is some warrant for this genealogy, because the art of Gothic architecture and its allegorical meaning were in no small degree the possession of the stone-cutters who were employed by the abbots in eccles. building and repairs. The secret signs used by itinerant masons were devised for the purpose of mutual recognition of each other as experts in their art and not mere impostors. Moreover, the 12th cent. affords something like proof of the existence of an association of Bauhütten (literally 'wooden huts' of masons or stone-cutters) in various parts of Germany, bound together by common craft laws and trade customs, and acknowledging a common ceremonial and set of symbolic forms.

Whatever the origin of F., there is clear enough evidence that modern F. in England dates from the foundation of the Grand Lodge of England in 1717; that of

Ireland being founded about 1725, and Scotland in 1736. But what particular processes were at work in the transition from 'operative' to modern or 'speculative' F. it is hard to say. The traditions of F. seem to warrant the assumption that in spite of the fact that medieval operative freemasons were usually engaged in erecting or repairing church buildings, they had no marked reverence for the Church doctrine, and that though the Church was at first disposed to extend its favour to the association, it eventually grew hostile to it and supported the ineffective prohibition of F. enacted by the statute of 3 Henry VI (1424). It is possible that freemasons, no less than other men, were affected by the spirit of the Reformation and the speculations of Bacon on the possibilities of natural laws in the satisfaction of human needs. Be the psychological connection what it may, F. received a fresh impulse towards the latter part of the 17th cent., when a general assembly of masons resolved to extend masonic privileges to other than operative masons, to adopt ancient symbols of fraternity, and generally to revive the system of F. The antiquary Elias Ashmole is credited with being the first amateur or speculative member 'accepted' (1646), and the name of James Anderson, a Scottish minister, is commonly associated with the work of revival. The constitution of one grand lodge, composed of prov. or other smaller lodges, presided over by a grand master, dates from 1717 (see above), and it is from this time, too, that the prerogative of creating new lodges was vested in the grand master. Later, prov. grand masters were appointed, and the purpose of speculative F. tended more and more to become purely benevolent. Still later, the requirement in members of a knowledge of ordinary masonry was dropped, although even now the association, when laying foundation stones, does so with full masonic honours. Its members as a whole profess benevolence and charity rather than architectural or stone-cutting skill.

F. is less popular on the Continent than in Great Britain. The pope issued a bull excommunicating freemasons in 1738, and F. was one of the errors condemned by the syllabus of 1864. In France, however, F. was from its inception early in the 18th cent. strongly favoured by the nobility, in spite of imperial censure and papal bulls. Notable Fr. masonic orders of the 18th and early 19th cents. were La Félicité, La Grande Loge Anglaise de France and La Grande Loge Nationale (afterwards the Grand Orient), and Le Suprême Conseil; one at least of which was nothing more than a Jacobite combination. It is said that the general atmosphere of Fr. F. was low, and colour is given to this assumption by the fact that admission to membership could be purchased without any inquiry into character. Later, Fr. F. became infected with mysticism and the most grotesque 'degrees.' In France, as in Italy, Hungary, and elsewhere on the Continent, there was a strong tendency

for F. to become involved in politics and thereby to incur the hostility of the State. For this reason, relations between Brit. and Fr. freemasons were never close. Prior to the First World War, the Grand Orient had some 300 lodges; but owing to their political activities, and still more on account of the exclusion from their rules of the familiar reference to the Great Architect of the Universe, the regular grand lodges later seceded from the Grand Orient, and in 1914 there came into existence a new body which styled itself La Grande Loge Nationale indépendante et régulière. In Italy, F. was dissolved by Fascist decree (see also ITALY). In Germany the advance of F. was furthered by the brilliant intellectual support of such men as Lessing, Herder, Fichte, and Goethe, but F. disappeared under the Nazi regime. F. was introduced into the U.S.A. in 1730, when a deputation from the Grand Lodge of England appointed Daniel Cox Prov. Grand Master for Pennsylvania, New York, and New Jersey.

F. received a great increase in membership between the 2 world wars, and it now flourishes amongst all the Eng.-speaking nations; but in countries which are predominantly Roman Catholic or are governed by dictatorship F. has latterly been banned. Within the craft there has grown a marked tendency of late to take a much greater interest than hitherto in the intellectual side of the subject; numerous study circles have been formed in the lodges and lectures have become increasingly popular.

See G. Oliver, *Institutes of Masonic Jurisprudence*, 1859; G. Findel, *History of Freemasonry* (trans.), 1866; A. Churchward, *Origin and Evolution of Freemasonry*, 1920; R. F. Gould, *The Concise History of Freemasonry*, 1920; W. Wilmshurst, *The Meaning of Masonry*, 1922, and *The Masonic Initiation*, 1924; M. Johnson, *Beginnings of Freemasonry in America*, 1924; F. de P. Castells, *English Freemasonry, 1600-1700*, 1931; A. Robbins, *English-speaking Freemasonry*, 1936; and B. E. Jones, *Freemasons' Guide and Compendium*, 1950.

Freeport, city, co. seat of Stephenson co., Illinois, U.S.A., on the Peconica R., 100 m. NW. of Chicago. F. manufs. food products, toys, batteries, machinery, and patent medicines. Here, in the Lincoln-Douglas debates, Lincoln maintained the so-called 'Freeport doctrine' on slavery. Pop. 22,500.

Freesia, genus of South African cormous plants, family Iridaceae, 4 species; grown in gardens and greenhouses for their elegant and fragrant flowers.

Freestone, building stone that is granular in structure and can be split readily in any direction. Stones used as F.s are usually sandstones or limestones. Though fairly compact in structure, they are free from irregularities, and there is no distinct cleavage. They may be quarried in large blocks, and dressed or carved in any fashion without risk of breakage. The F.s of the N. of England are usually

sandstones; those of the S. and W. are limestones.

Freethinkers, name for those who reject belief in divine revelation, applied especially to the Eng. Deists of the 17th and 18th cents. The name was accepted by the rationalists as implying that they thought freely for themselves on all questions, including religion. See also **DEISM**. See G. Lechler, *Geschichte des Englischen Deismus*, 1841; and A. S. Farrar, *Critical History of Free Thought*, 1862.

Freetown, cap. of Sierra Leone, West Africa, situated at the mouth of the Sierra Leone R., near the coast. It has a fine harbour protected by fortifications and is a strategically important base. It contains wharves, gov. offices, the governor's residence, a cathedral, the supreme court, a technical school, and Fourah Bay College. The chief exports are diamonds, iron ore, palm kernels, and coffee. Since the marshes have been drained F. is much healthier, and there have been few cases of yellow fever since the introduction of a piped water-supply. F. has a mean ann. rainfall of 174 in.

In 1893 the management of F. was put into the hands of a council of 15 members, 12 of whom were elected by the people, and 3 appointed by the governor of Sierra Leone. The council elected a mayor from its members. The African pop. therefore controlled the gov. of the tn, but in 1926 the municipality had to be dissolved following a series of financial scandals. It was replaced by a tn council with an official majority. Pop. 70,000 (estimated, 1952).

Freezing, change from a liquid to a solid state. This can be effected by cooling the liquid to a definite point of temp., which is invariable for the same substance under similar conditions of pressure. So well is this recognised that the F.-point of water is one of the standard thermometric points, the other being the boiling-point of water. In the centigrade and Réaumur scales the F. point of water is 0°, in the Fahrenheit scale it is 32°. The temp. at which a solid melts is theoretically the same as that at which the liquid form solidifies, therefore F.-point and melting point are interconvertible terms. In practice, however, it is often possible to supercool a liquid, i.e. cool it to below the melting-point without F. it. After a solid has been warmed to its melting point, yet remaining solid, further heat must be added before it becomes liquid. The amount of heat which is thus absorbed per unit mass, without change of temp., is called the latent heat of fusion. When a substance solidifies to an amorphous solid, the process of transformation is a gradual one; that is, the liquid gets more and more viscous, until it becomes solid throughout. When a substance solidifies to a crystalline state the change is sudden, and solid and liquid portions remain in contact; this is the case with water. Water is an anomalous substance in that after contracting through a long range of decreasing temp.,

it expands below 4° C. before the F.-point is reached at 0° C. Because it expands on F., ice is lighter than water, and the effect of pressure on the liquid is to lower the F.-point, as expansion is thereby retarded. The addition of an impurity, like salt or sugar, to water also lowers the F.-point. When any portion of the water solidifies, the substance dissolved is separated out, and dissolves in the portion still liquid. This process absorbs heat, so that solidification is hindered. The liquid portion gradually becomes more concentrated until it is saturated, after which the salt or sugar appears in the solid mass. It is not, however, in solution, but is in the form of small crystals embedded in the mass of ice. Such a mixture is called a eutectic (q.v.) and for metal alloys often has special properties of importance in physical metallurgy (q.v.). See **PHYSICAL CONSTANTS**.

Freezing Mixtures, mixtures of substances which have an affinity for each other, such that heat is absorbed by their combination or solution. The commonest F. M. is ice and salt. The lowering of the temp. is caused by the affinity of salt and water; a solution is formed, both ice and salt being transformed into the liquid state, heat being abstracted from the mixture and surrounding objects to effect this. As long as there is still a supply of ice and salt, the process of solution goes on until a definite limit of temp. (-23° C.) is reached, at which limit the 2 substances become solid together, forming a *cryohydrate*. Other F. M. are: powdered sodium sulphate, or ammonium nitrate with water, temp. -15°; sodium sulphate, 8 parts, hydrochloric acid, 5 parts, temp. -17°; sodium phosphate, 9 parts, dilute nitric acid, 4 parts, temp. -29°; crystalline calcium chloride, 10 parts, snow or powdered ice, 7 parts, temp. -55°. A mixture of solid carbon dioxide and ether is a valuable F. M., while solid carbon dioxide itself ('dry snow') is used in the ice-cream and engineering industries. For very low temps., liquid oxygen, or even liquid hydrogen may be used.

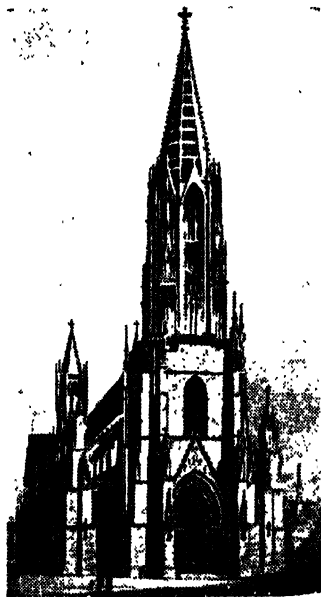
Fregenal de la Sierra, Sp. tn in the prov. of Badajoz. It has an ant. castle of the Templars, textile and flour manufs., and has an ann. cattle fair. Pop. 10,200.

Freiberg: 1. Ger. tn in the dist. of Karl-Marx-Stadt, at the N. foot of the Erzgebirge (q.v.), 18 m. ENE. of Karl-Marx-Stadt (q.v.). It was the scene of a Prussian defeat of the Austrians during the Seven Years' War (1762). It has a fine basilica, with a notable S. portal, the 'Golden Gate,' which dates from the 13th cent. There is a radium research institute, and a mining academy founded in 1765. There are mining and smelting industries (lead, zinc, nickel, tin), and manufs. of textiles, machinery, precision instruments, and leather goods. Pop. 40,000.

2. See **PRIBOR**.

Freiburg (Switzerland), see **FRIBOURG**. **Freiburg-im-Breisgau**, Ger. city in the Land of Baden-Württemberg (q.v.), 80 m.

SW. of Stuttgart. It is in the Breisgau, at the W. edge of the Black Forest (q.v.). It was founded c. 1120, and came into the hands of the House of Hapsburg (q.v.) in 1368. It was in the possession of the Fr. 1679-97 and 1744-8. In 1806 it became part of Baden. During the Second World War a large part of the medieval Inner Tn was destroyed, but has since been rebuilt. The city was taken by Fr. troops in April 1945. From 1946 until 1952 it was cap. of the *Land* of Baden.



FREIBURG CATHEDRAL

The archiepiscopal cathedral, begun in the 12th cent., is one of the most perfect specimens of Gothic architecture in Germany; it is built of red sandstone, and its tower, 386 ft high, is considered one of the finest in Europe. Among other notable buildings are the arcaded Merchants' Hall, the *Kaufhaus*, which dates from 1525; the 18th-cent. archbishop's palace; a 13th-cent. Franciscan church; and anc't city gates. The famous univ. was founded in 1457. There are sev. museums and scientific institutions. The chief industries are the manuf. of textiles, metal goods, and wine. Pop. 128,300.

Freienwalde, Ger. tn in the dist. of Frankfurt an der Oder, near the Oder (q.v.), 37 m. NW. by N. of Frankfurt (q.v.). It has chalybeate springs, and there are lignite mines in the dist. Pop. 11,000.

Freight, originally the cargo of a ship, has now come to mean anything carried for payment by water or land, whence the term is used for the price paid the shipowner for the transportation of goods. It was formerly considered that the total F. must cover the wages of the crew and the incidental charges and expenses of the shipping business as well as the interest and depreciation of the capital invested in the shipping. 'Freight was the mother of wages,' but this was modified by the Merchant Shipping Act, 1854. In modern times, owing to the general use of steamers and their increased size, the cost of carriage has been considerably reduced, with a resulting great increase in trade. (See INTERNATIONAL TRADE.) Some bulky articles of cargo are sometimes carried at a very low rate because of their usefulness as ballast.

Freiligrath, Ferdinand (1810-76), Ger. poet, b. Detmold, son of a school-teacher; he was apprenticed to a grocer and was in turn a bank clerk and bookkeeper. He wrote verses for small Westphalian papers and, in 1838, pub. his first vol. of *Gedichte*. Their immediate popularity induced him to turn to literature for a living and he soon found himself one of the favourite poets of his time. Up to 1842 his poetry was free from politics, but his democratic opinions, expressed in the poems *Ein Glaubensbekenntnis*, 1844, and *England an Deutschland*, led to friction with the gov. and he was forced to seek refuge in Switzerland. Here he prepared a vol. of *Englische Gedichte aus neuerer Zeit*, 1846, containing trans. from Tennyson, Longfellow, Southey, and others, and a vol. of political songs entitled *Ca Ira!* The pub. of the last-named led to his flight to London, and in 1848 he was about to emigrate with his family to America when he was allowed to return to Germany. He became leader of the Democratic party in Düsseldorf, but was imprisoned for publishing his poem *Die Toten an die Lebenden*. His *Neue politische und sociale Gedichte*, pub. in 1850, led to further arrest and a charge of lese-majesty, but he was acquitted and left for London. While again working as a clerk he pub. a trans. of *Hiawatha* in 1857 and also trans. of *Cymbeline* and the *Winter's Tale* for a Ger. ed. of Shakespeare, ed. by Bodenstedt. Following a political amnesty he returned to Germany and at Stuttgart pub. some songs, such as *Hurrah Germania!* and the *Trompete von Gravelotte*, which became very popular. From a literary standpoint his best poems are *Die Auswanderer*, *Prinz Eugen*, *Moos-thee*, *Die Blumenrache* (*Revenge of the Flowers*), and others, written before 1840. An ed. of his collected works was pub. in 6 vols. in 1870 and after. There is also a Tauchnitz ed. The charm of F.'s poetry lay in its originality of subject and sentiment, while in a number of his poems, such as *Skating Negro* and *Revenge of the Flowers*, there is an element of the grotesque and eccentric. See G. Freiligrath, *Erinnerungen an F. Freiligrath*, 1889; E. G. Gudde, *Freiligraths Entwicklung*

als *politischer Dichter*, 1922; G. W. Spink, *Freiligraths Verbannungsjahre in London*, 1932; H. Eulenberg, *F. Freiligrath*, 1948.

Freising, Ger. tn in the *Land of Bavaria* (q.v.), on the Isar (q.v.), 19 m. NNE. of Munich. It was made a bishopric in 724, and was later the seat of prince-bishops. The tn is medieval in appearance, and has a fine cathedral (1161-1205). Its former Benedictine abbey (now a school of agriculture and brewing) contains one of the oldest breweries in the world. There are engineering, dyeing, and saw-milling industries. Pop. 27,000.

Fréjus (anc't *Forum Julii*), Fr. tn in the dept of Var, 16 m. SW. of Cannes. It stands on a hill above an alluvial plain 1 m. from the Mediterranean. It was founded by Caesar, and has Rom. remains, including an amphitheatre, baths, and aqueduct. The Gothic cathedral has a fine 5th-cent. baptistry. The old harbour (built by Augustus and silted up by the R. Argens) is now vine-covered. There are cork, olive-oil, and wine industries. Pop. 13,400.

Fremantle, chief seaport of Western Australia, situated at the mouth of the Swan R., 12 m. SW. of Perth. The harbour has 11,000 ft of berthing space, and has mechanical aids for loading and discharging and the bulk handling of wheat. The prin. manufs. are leather, biscuits, flour, beer, lumber, soap, and iron and steel goods, and there are cold storage works and wool warehousing undertakings. Pop. 32,000.

Frémiet, Emmanuel (1824-1910), Fr. sculptor, b. Paris, nephew and pupil of Rude; he devoted himself chiefly to animal sculpture and equestrian statues in armour, singly and in groups, the best of which are 'Joan of Arc,' 1874, in the Place des Pyramides, Paris; 'Condé,' 1881, 'Joan of Arc,' 1889, at Nancy; 'Velazquez,' in the Jardin de l'Infante at Paris. He also excelled in imaginary groups, chiefly of animals: 'Gazelle,' 1843, exhibited at the Salon; 'Gorilla carrying off a Woman,' 1887. See life by Biez, 1900.

Frémont, John Charles (1813-90), Amer. explorer, b. Savannah, Georgia. From 1842 to 1854 he explored Oregon, New Mexico, and California. In particular he explored the S. pass of the Rockies, and estab. the practicability of an overland route; and the Great Salt Lake and the upper reaches of the Rio Grande. He also rendered valuable service in the Mexican war. He came into national notice again in 1856 when the Republican party was founded. Although it had far abler men in its ranks, it nominated F. for president in the anti-slavery interest, but he was not successful. Without consulting the president, he issued a proclamation confiscating the property and freeing the slaves of all Missourians who took up arms against the gov. President Lincoln removed him from his post, but afterwards gave him a chance to serve in an important command. F. declined. He was ruined in later years in railway speculations and was governor

of the ter. of Arizona 1878-81. He pub. *Memoires of my Life* in 1887. See life by A. Nevins, 1928.

Fremont: 1. City of Ohio, U.S.A., cap. of Sandusky co., on Sandusky R. about 30 m. SE. of Toledo in the midst of an agric. region. The chief manufs. are automobile parts, cutlery, electrical goods, and rubber products. F. has the tomb of President Rutherford B. Hayes. Pop. 16,500.

2. City of Nebraska, U.S.A., and cap. of Dodge co., situated on the Platte R. It is a trade and distribution centre in a prairie region producing grain and livestock. F. manufs. cement and tile products, machine parts, beverages, feed, and dairy and poultry products. Fruit and flour are also produced. Midland College and Western Theological Seminary are here. Pop. 15,000.

French, Daniel Chester (1850-1931), Amer. sculptor, b. Exeter, New York; studied at Boston and had studios at Washington, Boston and Concord, Massachusetts, and New York. His best-known works are a statue of Gen. Cass at Washington; Rufus Choate at Boston Court House; John Harvard at Cambridge, Massachusetts; the Milmore Memorial, Boston; statue of the rep. at Chicago Exposition; 4 groups, Europe, Asia, Africa, and America, in front of New York Custom House; and Abraham Lincoln at Lincoln, Nebraska.

French, Sir John Denton Pinkstone, see YPRES, EARL OF.

French and Indian War (1754-60), last of series of wars between France and Great Britain, the Fr. being assisted by sev. Indian tribes. The prin. events of it were capitulation of Washington and Fort Necessity, 1754; Braddock's defeat, 1755; capture of Oswego and Fort William Henry by Gen. Montcalm, 1756-7; capture of Fort Duquesne, 1758; and of Ticonderoga and Niagara, 1759; battle of Quebec, 1759; surrender of Montreal, 1760.

French Architecture, up to very recent times, has always been strongly influenced by that of Italy, though in both the Romanesque and the Gothic periods the Fr. were innovators rather than followers. So also in the late 19th and early 20th cents. they were the pioneers of reinforced-concrete construction and of 'functional' architecture. The Rom. occupation of Gaul (France) left an important heritage of monumental buildings in Provence, including the amphitheatres at Nîmes, Arles, and Avignon; the magnificent aqueduct near Nîmes known as the 'Pont du Gard' (16 bc); and the little temple at Nîmes known as the 'Maison Carrée.' In Paris there are the remains of a Rom. palace with baths, adjoining the Musée de Cluny. At St Rémy is a Rom. monument, and at Orange and Saintes are Rom. arches. These various buildings range in date from c. 40 bc to c. ad 50.

Even before the evacuation of France by the Rom. legions at the beginning of the 5th cent. ad, a large number of Christian churches had been erected.

partly owing to the energy of St Martin of Tours (c. AD 316-400); but nothing substantial remains of any of them, not even of the large church built to his memory at Tours in 472, or of other large churches at Lyons and Clermont. The oldest surviving church in France, much altered since its erection in 682-96, seems to be the so-called 'Temple of St Jean' at Poitiers, a small rectangular building with apses, incorporating a Gallo-Rom. baptistery. After another long interval of time, we find a rare example in the small but very interesting church at Germigny des Prés (c. 810), which has a Byzantine 'Greek cross' plan, and sundry Muslim details, reminding us that the victorious advance of the 'Saracens' into France was only halted by the great battle of Tours in 732. There are a few other Carolingian churches: at St Philbert de Grandlieu (c. 819, but much altered since), St Martin at Angers, etc.; but Romanesque A. proper in France does not begin till c. 1000. Examples from the 11th cent. include the vaulted crypt of St Bénigne at Dijon (1001), St Hilaire at Poitiers (1018-59), St Front and St Étienne at Périgueux (1047), the Abbaye aux Dames and the Abbaye aux Hommes at Caen (1066), St Sernin at Toulouse (finished 1099), the abbey of Cluny (1089-1131) and Vézelay (1089-1140), and Notre Dame du Port at Clermont.

It will be noticed that few of these examples antedate the 'Norman Conquest' of England; indeed, at that time few Fr. buildings surpassed our own rather primitive 'Saxon' churches. The 12th cent. saw the building of the important abbey of St Denis near Paris (1132-44) and of St Trophime at Arles (1152); but before the end of that century the pointed arch had appeared, and, by 1215 or so, Gothic A. was in full swing. The 12th cent. also saw the erection of many stone-built fortresses (see CASTLE), but few substantial dwellinghouses for ordinary people.

The prin. early-Gothic churches in France are the cathedrals of Amiens, Bayeux, Bourges, Chartres, Coutances, Laon, Paris (Notre Dame), Rheims, and Rouen, and the Sainte Chapelle at Paris (1244-7). Compared with Eng. examples, they are shorter, wider, and loftier. They have a *chevet* (ring of chapels) round an apsidal E. end, whereas in England the typical E. end is square. They usually have W. towers, and seldom a central tower. When tracery came to be introduced into windows, it was composed of geometrical forms until the 'flamboyant' type (possibly derived from Eug. 'flowing decorated' tracery during the Eng. occupation in the 14th cent.) became popular: there are examples at St Wulfram, Abbeville, and at St Ouen, Rouen. The Eng. 'Perpendicular' style had no counterpart in France. Fine examples of late-Gothic houses are those of Jacques Cœur at Bourges (1443), the Hôtel de Bourghérôle at Rouen (1475), and the Hôtel de Cluny at Paris (1485, now a museum). The Château of Pierre-

fonds (1396) is a magnificent castle, in excellent preservation; as is the noble Palace of the Popes at Avignon (1316-70). Notable fort. tns are Aigues Mortes, Avignon, Carcassonne, and Mont St Michel.

The Renaissance entered France from Italy late in the 15th cent., at first replacing Gothic very gradually, as in England. François I introduced a number of It. architects at Fontainebleau, Amboise, Blois, etc. Among them was Serlio (q.v.). Fr. architects soon acquired the new It. fashions in design, and during the 16th cent. built the first part of the New Louvre in Paris, the *château* of St Germain, and many of the picturesque *châteaux* in the Loire valley, e.g. Chambord, Azay-le-Rideau, Chenonceaux (see BULLANT, DELORME, LESCOT). Early in the 16th cent., Lescot (q.v.), who had studied in Rome, designed the older part of the palace at Versailles; the Palais Royal, and the churches of the Sorbonne and St Roch—all in Paris; and laid out the remarkable little tn and *château* of Richelieu for the cardinal of that name.

François Mansart (q.v.) enlarged Lescot's Carnavalet Museum and built the fine church of Val-de-Grâce, both in Paris; also the beautiful *château* at Maisons near Paris, his masterpiece, in 1642-51; and the Orleans wing at Blois.

He was followed by his kinsman J. H. Mansart (q.v.), the favourite architect of Louis XIV, who made Versailles one of the largest palaces in the world, designed the cathedral there and the church of the Invalides in Paris; and planned the Place des Victoires and the Place Vendôme—both in Paris. During the 18th cent., the 2 most talented architects in France were J. J. Gabriel (q.v.) and his son A. J. Gabriel. Their work is more scholarly and refined than that of J. H. Mansart. Their prin. buildings, mostly outside Paris, are listed under their respective names.

After the Fr. Revolution, and under Napoleon, there ensued the 'Empire' phase in F. A., when inspiration was derived from Pompeian, Gk. and even Egyptian sources. During the middle years of the 19th cent. France experienced the 'Gothic Revival' (see VIOLETTÉ-LE-DUC) and the 'Free Classic Revival,' though still retaining some of her native architectural tradition; but towards the close of that century began to take the lead in Europe in developing reinforced-concrete construction, a form of building which soon began to revolutionise her architecture, notably in the work of A. G. Perret (q.v.). His brilliant pupil, the Swiss architect 'Le Corbusier' (q.v.), settled in Paris in 1922, and became the leader and prophet of the so-called 'Modern Movement' in architecture. The work of both men is summarised under their respective names.

See G. H. West, *Gothic Architecture in England and France*, 1911; Sir R. Blomfield, *A History of French Architecture from 1494 to 1774* (4 large vols.), 1911-21; P. Lavedan, *French Architecture*, 1956.

French Art. Painting.—Miniature painting and illuminating were practised in

the Middle Ages and some of the most famous illuminated psalters came from Paris. France contributed much to the formation of the Gothic style in miniature work. The illuminations of the 14th cent. were in realistic style and the Parisian school was noted. Separate schools grew up also in Burgundy and Avignon. The stained-glass workers of Chartres, inheriting the traditions of St Denis, contributed their beautiful designs to the decoration of eccles. buildings, and also highly decorative in tendency were the metal work and mural painting, which latter imitated the colouring of the stained glass.

Early Renaissance painting in France was inspired by the work of Italians summoned to France by kings and municipalities (Fontainebleau School), though there were traces of a change in Fr. art, transforming the Gothic, even before it felt the influence of such Italians as Primaticcio (1504-70).

Jean Fouquet (q.v.), the greatest Fr. painter of the 15th cent. (*temp.* Louis XI), was also noted for his illuminated work; also notable were Nicolas Froment and the miniaturist Bourdichon.

Fr. painting of the 17th cent. is represented chiefly by the work of Claude of Lorraine (1600-82) (q.v.) and Nicolas Poussin (q.v.) and also, though in much less degree, by Callot (1592-1635) (q.v.), the brothers Le Nain (q.v.) (Louis, 1593-1648) and Georges de la Tour (1593-1653). Poussin was the originator of the classic landscape, in which gods and heroes are depicted in a natural environment. Claude of Lorraine was also a classic landscape painter with a passion for light and he has often been compared to Turner. Of the same period are the portraits of women disguised as Olympian divinities, by Nicolas de Larivière, the decorative work of Charles Le Brun (q.v.) (1619-90), and the graceful frescoes of Pierre Mignard (q.v.). The famous names in Fr. 18th-cent. painting are those of Antoine Watteau (1684-1721) (q.v.), Jean Baptiste Chardin (1699-1779) (q.v.), François Boucher (1702-70) (q.v.), and Honoré Fragonard (1732-1806) (q.v.). Watteau is famous for his *scènes galantes* depicting amorous couples in highly realistic landscapes. Youth, gaiety, iridescent gowns, the play of arms and hands all have their part in the seductive dreams of his terrestrial Olympus. Chardin was, above all, the painter of the *petite bourgeoisie* and the poet of still life. Greuze (1725-1805) (q.v.) is notable for his idyllic studies, but to-day he is remembered, though not over-admired, for his pictures of demure-eyed maidens. Mythology, landscape, and feminine nudes are all subjects of Fragonard's vivacious work. Other names of this period are N. Lancret (1690-1743), Maurice Quentin de La Tour (1708-88), Jean Marc Nattler (1685-1766), and Madame Vigée-Lebrun (1755-1842) (q.v.), chiefly a portrait painter.

The 19th cent. is considered by some the greatest age of Fr. painting and the

names of celebrated artists are legion—David, Ingres, Delacroix, Corot, Millet, Daubigny, Théodore Rousseau, Daumier, Courbet, Manet, Gauguin, Degas, Monet, Renoir, Seurat, Pissarro, Cézanne. Prud'hon (1758-1827) (q.v.), an enthusiast for Gk beauty, is famous for his allegories of love. David (1748-1825) (q.v.) who strongly influenced the period, was a neo-classicist and may be said to have founded a school of historical painting. His greatest pupil was Jean Auguste Dominique Ingres (1780-1867) (q.v.), who, however, also derived much inspiration from Raphael. A main feature of the early 19th-cent. period of Fr. painting was the struggle between Classicism and Romanticism. The leader of the Romanticists' revolt was Delacroix (1798-1863) (q.v.), a place that might well have been taken by Géricault (1791-1824) (q.v.), who d. prematurely. Delacroix looked upon his art as a medium for the reflection of his own intensely emotional temperament. Corot (1796-1875) (q.v.) was the great master of a new school of Fr. landscape painting. No other artist has been so imitated. He enjoyed, especially in his later years, an extraordinary popularity. He is famous for his 'poetic' landscapes—luminous and misty—and for the plastic mastery shown in his figure-pieces—often a girl reading or a reclining woman, and either a full or half figure. Corot worked at Barbizon but is distinct from the 'Barbizon' (q.v.) group or Fontainebleau school—a school of 'pure' landscape painters, partly inspired by the Dutch painters Hobema and Ruysdael. Fr. painters of this group are Jean François Millet (q.v.), Daubigny (q.v.), Théodore Rousseau (q.v.), and Constant Troyon (q.v.). Gustave Courbet (1819-77) (q.v.) also reacted against the classicists, but, as a realist looking at things as they were, he also reacted against the Romanticists. Manet (1832-1883) (q.v.) may also be regarded as a realist, and his brilliant modern treatment of old master themes, as in his 'Olympie', shocked Paris. Claude Monet (1840-1920) (q.v.) is famous as the head of the Impressionist school. He shows remarkable subtlety in painting the variations of atmosphere and light at different times of day. He began as a member of the group inspired by Manet. One of his principles was that what the subject intrinsically is really does not matter, but only its appearance under light. Other painters of this school are Auguste Renoir (q.v.) and Camille Pissarro (q.v.). Hilaire Germaine Edgar Degas (1834-1817) (q.v.), a famous realist who studied and admired the work of Ingres, tempers atmospheric impression with a sense of structure and form. His themes are generally taken from contemporary Parisian life—particularly dancing girls, *modistes*, and washerwomen. Daumier (1808-79) (q.v.) began as a cartoonist and his paintings attracted only the discerning critics in his lifetime, yet to a greater degree than with most of his contemporaries they reveal the plastic vitality which is associated

with the masterpieces of Cézanne. Cézanne (1839-1906) (q.v.) learned from Manet and Pissarro before his own revolutionary ideas made him a lone iconoclast, violating every law of representation as known to the realists and yet clinging to nature as source and inspiration. He is first among modern artists by reason of both spiritual leadership and achievement in his own art. From his work a new W. aesthetic has been fashioned, schools of painting have derived their inspiration, and a revolution in practice has taken place. Seurat (q.v.) is a neo-Impressionist expert in the *pointilliste* system. Puvion de Chavannes

Some of its famous representatives, like Picasso, came from outside France, but among the notable Fr. painters are such men as Vuillard, Bonnard, Dufrenoy, Marquet, La Fresnaye, Delaunay, Utrillo, Léger, Rouault, and Dufy. The post-war period seems to indicate a struggle between the tendency towards a purely abstract or non-representational form of painting (Maurice Estève, 1904-) and a somewhat harsh form of realism as in the work of Edouard Pignon (1905-).

Sculpture and Decorative Arts.—The Fr. gift for sculpture was early shown by the Gothic 'imagiers' of the 13th cent. The art of portraiture in sculpture began in



'SOUVENIR DE MORTEFONTAINE': A LANDSCAPE BY J. B. C. COROT (1796-1875)

(1824-98) (q.v.) is important in the technique of decorative painting. Paul Gauguin (1848-96) (q.v.) reverted, for inspiration, to primitive art as illustrated by life in the South Sea Is. Henri Rousseau (1844-1910), also known as Le Douanier, in scenes depicting life in France and memories of Mexico, where he soldiered, revealed a true 'primitive'.

Famous 20th-cent. painters are Georges Braque (1881-) (q.v.), Henri Matisse (1869-1954) (q.v.), and Pablo Picasso (1881-) (q.v.). Braque is notable for his cubist technique; Picasso is supreme as an experimentalist in diverse forms of expression. The work of Matisse is masterly in its summary expression of form and rhythm and has much in common with E. painting. (See also individual names.)

The new ideas of painting successively launched in Paris made that city the unquestioned centre, and seat of an international 'school,' L'Ecole de Paris.

France in the late 14th cent., the masterpieces of Gothic sculpture of the period being the sepulchral effigies at Dijon, effigies which gradually replaced the recumbent figures. A notable sculptor of the Renaissance period was Michel Colombe (1431-1512). Jean Goujon (q.v.), skilled in bas-relief, Germain Pilon (q.v.), and Jean Cousin (q.v.) are all well-known artists who succeeded in moulding the Florentine spirit to Fr. genius. The Renaissance in France also saw brilliant enamelling work, especially by Léonard and Jean Limousin (q.v.); the ceramics of Bernard Palissy (q.v.); and much fine work by Fr. goldsmiths. Themes from classical mythology were generally chosen by these renaissance artists. In the earlier part of the 17th cent. Fr. sculpture was mainly sepulchral, notable sculpture in this kind being François Anguier (c. 1604-69), who modelled the *duc de Montmorency's* tomb at Moulins, and Jacques Sarrazin (1638-1660), sculptor

of Henri de Condé's tomb at Chantilly. A fresh expansion came with the encouragement of a grandiose secular art by Louis XIV. Girardon (1628-1715) (q.v.), whose masterpiece is Richelieu's tomb in the Sorbonne church, was extensively employed on the sculptural decoration of Versailles. The portrait sculptures of Coysevox (1640-1720) are remarkable for their vitality. In the same century a regular school of engraving developed at the Gobelins under Sebastien Leclerc, and the industrial arts were enriched by the cabinet inlaid-work of Boulle (q.v.) and the incised *objets d'art* of the Fr. silversmiths. It is to be noted that most of the 17th-cent. F. A. of the reign of Louis XIV, whether in painting, architecture or sculpture, was 'dictated' art, organised under the direction of Le Brun (q.v.), the king's chief painter, director of the Gobelins workshop, rector of the Royal Academy of Painting and Sculpture, and Colbert's technical adviser. The work of the artists so commissioned suffers to some extent from this official inspiration; but under Colbert's forceful administration Fr. artists of this, the classical period of the *Grand Siècle*, succeeded in profoundly influencing art throughout Europe.

Jean Antoine Houdon (1740-1828) (q.v.) stands out in the 18th cent., but later Fr. sculpture is represented pre-eminently by Rodin (1840-1917). Mention should be made of Rude (1784-1855), Carpeaux (1827-75), and Bartholomé (1848-1928) (q.v.), but Rodin is one of the rare creative geniuses. Believing that the art of the sculptor had fallen into a cold formula, he sought to revive it by infusing a romantic warmth of feeling. Maillol (q.v.) and Despiau, working within the limits of old tradition, have become part of the hierarchy of sculptors whose reputation will endure. Another notable sculptor is Antoine Bourdelle (q.v.) in whom, as in Maillol, there is the grandeur of solid form. Degas, the painter, produced brilliant figurines, and Matisse also is among the modern painters (as also Picasso) who have applied an unconventional outlook to sculpture.

See also ART; FRENCH ARCHITECTURE; IMPRESSIONISM; PAINTING; SCULPTURE. See A. Clutton Brock, *An Introduction to French Art*, 1931; E. Ciochia, *La Sculpture en France depuis Rodin*, 1945; J. Rewald, *The History of Impressionism*, 1947; Joan Evans, *Art in Medieval France*, 1948; R. H. Wilenski, *Modern French Painters*, 1949; and A. Blunt, *Art and Architecture in France, 1500-1700*, 1954.

French Bulldog, see BULLDOG.

French Canadian Literature. The background of F. C. L. is in some ways similar to and in others different from that of Eng. C. L. (see CANADIAN LITERATURE). One point of similarity is the original isolation of an infant colony in more or less hostile surroundings on a new continent distant from the motherland: a sense of embarrassing immaturity in the face of an older parent civilisation is thus apparent in the thought and art of both

Fr. and Eng. Canada. For Fr. Canada, however, the feeling of isolation was abruptly intensified by 2 major events in the 18th cent.: the Brit. conquest of Canada and the Fr. Revolution. These 2 crises oriented the thinking of Fr. Canada entirely in the direction of survival and are at the root of a strong urge to hold to the past. Devotion to *la survivance* has coloured every aspect of Fr. Canadian endeavour, political, social, religious, literary, and artistic. There is a tendency to equate the ideas 'French,' 'Canadian,' and 'Catholic,' for instance, and a strong feeling of solidarity has maintained the identity of Fr. culture in a predominantly Eng. milieu. In the present century Canada has attained a greater measure of national maturity which is reflected in its literature, both Fr. and Eng.; yet the emotional impact of racial and religious concepts remains strong in Fr. Canada.

Under the Fr. régime there was no original literature; various religious orders pub. accounts in France of their activities in Canada; the most famous of these is the *Relations des Jésuites*. There was no printing press in Canada under the Fr. kings, just as there was none for a long time in the Amer. colonies under the Eng. kings. Since the conquest F. C. letters seem to have developed more rapidly as an autonomous art than Eng. C. letters. The Fr. civilisation is more than a century older than the Eng. in Canada; it was more definitely cut off from its European origins; and the Frenchman seems by nature to be more inclined to philosophy, literature, and art than the A.-S.

For generations after the Brit. conquest Fr. Canada was spiritually numbed. The rebellion of 1837 gave birth to new feelings of pride and enthusiasm, however, and the first stirrings of literary production bear the imprint of Romantic nationalism. This spirit was eagerly seized by journalists and orators, among the most outstanding of whom was Etienne Parent, editor of *Le Canadien* with its fiery motto 'Nos institutions, notre langue et nos lois.' This vigorous spirit has been upheld by a succession of writers, Arthur Buies, L. O. David, Henri Bourassa, J. P. Tardivel, and others. It was Garneau's *Histoire du Canada*, appearing in the middle of the 19th cent., that provided a firm historical basis for the new attitude and inspired the writers of the day. Octave Crémazie, the first important poet, sings the glories of his race and his country; he is strongly under the literary influence of Victor Hugo, the leading Fr. Romantic poet. In *Les Anciens Canadiens*, Philippe Aubert de Gaspé, the first important novelist, lovingly records the traditions of New France that were in danger of disappearing. These two, with Louis Fréchette, are the most prominent names of what is called the 'Patriotic School' which had its centre in Quebec City. They, with others like Pamphile LéMay and Wm Chapman, are characterised by

pride of nation, appreciation of nature, and a Romantic ampleness of expression.

There was not much further development in the novel in the 19th cent. but poetry continued to flourish. Toward the end of the century a new emphasis became more and more evident. In the first place, the literary centre changed to Montreal from which the new school takes its name. Fr. poets are still the models followed, but now it is the Parnassians and the Symbolists who exert influences. The best-known names in this period are Jean Charbonneau, Emile Nelligan, Alfred DesRochers, and the critic 'Louis Dantin.' Their themes are less narrowly patriotic, more universal, and their techniques more polished and delicate. They were consciously appealing to a more intellectual public than their predecessors did.

The spirit of devotion to the land was by no means dead, however, and contemporary with the 'Montreal School' new group formed at Quebec, devoted to exploiting the themes of regionalism. This 'école du terroir' inspired both poets and novelists at the beginning of the 20th cent. Adjutor Rivard's *Chez nous* gives a sentimental picture of the rural scene; it forms the basis for a whole series of novels of the land which often paint a highly idealised picture. Great impetus was given by the Frenchman Louis Hémon who pub. the novel *Maria Chapdelaine* during the First World War. The most balanced and realistic picture of life on the farm is found in 'Kinguet's' *Trente Arpents* (Thirty Acres). Every aspect of regionalism is developed, however, and its themes have remained fruitful into the 1940's, producing for instance, Germaine Guèvremont's poetic novels and Yves Thériault's cynical and satirical ones. Among the poets of this school we may group Nérée Beauchemin, Blanche Lamontagne, Albert Ferland, and Alphonse Desilets.

At least 3 other types of novel have been developed, the historical, the urb., and the psychological. The first type is represented by Joseph Marmette, who wrote on the Fr. régime, R. L. de Roquebrune, on the rebellion of 1837, and L. P. Desrosiers, on the fur trade. The urb. novel has had a flourishing life, starting from the 1930's when rural themes were running out. The pictures of Montreal presented in Gabrielle Roy's novel *Bonheur d'occasion* (The Tin Flute) and of Quebec in Roger Lemelin's whimsical *Au pied de la pente douce* (The Town Below) as well as Lemelin's other novels on Quebec are the facets of Fr. Canada best known outside its own borders. The earliest proponent of the psychological novel was 'Laure Conan'; more recent psychological novels have been pub. by Robert Charbonneau, F. Loranger, Robert Elie, and André Giroux among others.

Poetry continues to flourish in Fr. Canada. Saint-Denis Garneau is the most recent to have become a national classic; he is among the best of many

good poets: Paul Morin, René Chopin, Robert Choquette. Sev. of the best authors are poetesses: Blanche Lamontagne, Simone Roullet, Eva Sénécal, and Anne Hébert. Groups of young poets such as the 'Hexagone' and the 'Cascade,' both in Montreal, continue to appear and poetry is still the most flourishing F. C. literature. It is characterised by variety of approach, sensitivity, comparative fineness of form, and is full of promise for the future.

The theatre has been neglected in both Eng. and Fr. Canada. The actor Gratien Gélinas made *Tit-Cog* famous, at least across Canada. Radio and television offer increasing opportunities to playwrights, some of whom are Roger Lemelin, Yves Thériault, André Giroux, and Germaine Guèvremont.

Theology, philosophy, and criticism are relatively important in F. C. cultural life; these fields bear the strong imprint of the Catholic tradition. The first important literary critic was Camille Roy. Prominent names in the field to-day are Scraphin Marion, Robert Itumilly, Guy Sylvestre, and W. E. Collin. Folklore has received much attention from Marius Barbeau and Luc Lacourcière.

See Camille Roy, *Histoire de la littérature canadienne*, 1930; Jules Léger, *Le Canada français et son expression littéraire*, 1938; J. M. Turnbull, *Essential Traits of French-Canadian Poetry*, 1938; D. O'Leary, *Le roman canadien-français*, 1954; L. Riess, *L'âme de la poésie canadienne française*, 1955.

French Equatorial Africa (formerly **French Congo**), a Fr. dependency on the W. coast of Africa, between the Cameroons and the Belgian Congo (qq.v.) and bounded on the N. by Libya and on the E. by the Sudan (qq.v.). The estimated area is 945,710 sq. m. and the pop. (1951) was under 5,000,000, of whom 21,885 were Europeans. Since then the pop. has increased considerably. Bantu tribes, and also pygmies, live in the S., and in the N. are Negroid-Hamitic peoples; nomads live in the desert. The climate is tropical and the rainfall uneven with a drier climate towards the N. The S. is heavily afforested, but gives way to savannah areas, and then to desert N. of Lake Chad (q.v.). The R.s Ogowe, Kulu-Niari, and Nyanga empty into the Atlantic, the Lerini, Alima, Kandeko, and Sangha are tribs. of the Congo, and the Shari empties into Lake Chad. The R. Ubangi, another trib. of the Congo, forms the greater part of the boundary between F. E. A. and the Belgian Congo. Rio Muni (or Spanish Guinea, q.v.) is in Gabon ter., on the Atlantic coast of F. E. A. The fauna of the region includes monkeys, gorillas, and leopards in the forests, and elephants, lions, buffaloes, and antelopes in the savannahs.

History.—Portuguese travellers discovered the coast of what is now F. E. A. in the 15th cent., but little exploration took place until the Fr. began to investigate the Gabon area, 1839–49, and pushed southwards. From 1888 to 1908 the area

French Equatorial

512

French Guiana

was known as Fr. Congo; in 1910 F. E. A. was estab., to include the 3 colonies of Gabon, Middle Congo, and Ubangi-Shari with Chad. Chad became a separate ter. in 1920.

Administration.—F. E. A. is divided into 4 ters.

	<i>Capital</i>	<i>Area</i> <i>sq. m.</i>	<i>Pop.</i>
Middle Congo	Pointe-Noire	132,000	746,193
Gabon	Libreville	103,000	383,410
Ubangi-Shari	Bangui	238,000	1,119,959
Chad	Fort Lamy	496,000	2,519,853

These 4 ters. are a federation and form part of the Fr. Rep. A decree issued in 1956 indicates an intention to pave the way towards self gov. The Federation cap. is Brazzaville (q.v.). In the Fr. Parliament F. E. A. is represented by 6 deputies, 8 senators, and 7 counsellors.

Resources and Trade.—Minerals exist in F. E. A. and those proved include gold, lead, iron, zinc, copper, tin, and manganese ore. Diamonds have been found. Prospecting for oil has been going on for some years. The following crops are grown in large quantities: cassava, millet, and groundnuts. Palm oil is produced. In Gabon, in the vicinity of Port Gentil, there is the world's largest plywood industry according to Fr. claims. Timber production in 1955 exceeded 620,000 tons. Hydro-electric schemes are being developed and a high potential exists. Imports in 1956 totalled 20,527 million francs in value, and exports 14,135 million francs. Indications were that the 1957 figures would not differ significantly from those of 1956.

<i>Main imports, 1956</i>	<i>Tons</i>	<i>Value in millions of francs</i>
Flour . . .	9,506	293
Sugar . . .	10,294	614
Wines . . .	18,833	562
Salt . . .	8,242	71
Cement and lime . . .	74,800	451
Petroleum products . . .	118,119	1,716
Cotton textiles . . .	2,685	985
Manuf. metal products . . .	16,796	594
Tools . . .	2,630	400
Other metal manufs. . .	12,399	957
Electrical equipment . . .	1,756	987
Vehicles and parts . . .	614	1,477
<i>Main exports, 1956</i>	<i>Head</i>	<i>Value in millions of francs</i>
Live animals . . .	18,527	244
	<i>Tons</i>	
Fresh meat . . .	1,637	141
Coffee . . .	5,894	744
Palm oil . . .	3,288	148
Cocoa . . .	2,946	265
Tobacco . . .	549	39
Groundnuts . . .	9,366	356
Lead ore . . .	6,000	135
Rubber . . .	237	28
Hides and skins . . .	844	84
Timber . . .	653,789	5,205
Cotton . . .	37,472	4,681
Sisal . . .	1,322	49

More than 50 per cent of the total trade is between France and F. E. A. Other countries trading with F. E. A. (and the value of their trade) were:

	<i>Millions of francs</i>	
	<i>Imports</i>	<i>Exports</i>
Brit. ters. in Africa . . .	281	390
Belgium . . .	435	155
Belgian Congo . . .	647	216
Netherlands . . .	1,661	337
Portugal and Portuguese colonies . . .	219	7
Union of South Africa . . .	71	100
United Kingdom . . .	523	319

Large funds have been made available from France for the development of F. E. A. and for public purposes. Of some £85 million put into F. E. A., approximately £30 million is invested in long-term loans at low rates of interest. A high proportion of the budget (20 per cent) is spent on education, and in 1955 151,298 children were attending schools.

Communications.—There are 20,000 m. of all-weather roads and 35,000 m. which are open most of the year. A railway runs from Brazzaville to Pointe-Noire, a distance of 320 m. The Ogowe R. is navigable at all times for a distance of 200 m. and the Shari R. from Aug. to Dec. for a distance of 500 m. Approximately 1600 m. of waterways are navigable above Brazzaville on the Congo-Ubangi system. F. E. A. is served by Air France, K.L.M., Sabena, and UAT airlines. There is an international airport outside Brazzaville. There are 3 ports: Pointe-Noire, Port Gentil, and Libreville.

See P. B. Du Challu, *Exploration and Adventure in Equatorial Africa*, 1861, 1945; H. Ziegler, *L'Afrique Equatoriale Francaise*, 1952.

French Gardening, see GARDENING.

French Guiana, or Cayenne, Fr. overseas dept on the NE. coast of South America, separated from Netherlands Guiana on the W. by the Itani-Moroni R., and from Brazil by the Oyapoc and the Tumuc-Humac Mts. Other rvs. are the Aoua, Approugue, Cayenne, Sinnamary, and Mana, all obstructed by falls. There is no railway; the main road is from Cayenne, westward 82 m. to Iracoubo, and a further 70 m. through Mana to St. Laurent. There is an airport on the mainland, at Rochambeau, 10 m. S. of Cayenne. The country is divided into 3 natural belts: the rugged, mountainous, little-known interior, covered in dense forest rich in valuable timber; the grassy savannah-land of the foothills; and a narrow belt of rich alluvial land along the coast. This last is very fertile, and here, though only about 9000 ac. have been cultivated, maize, manioc, rice, sugar-cane, coffee, cocoa, tobacco, and indigo are grown. There are 2 rainy seasons, and the rainfall frequently amounts to 135 or more in. in a year. The country is rich in animal and vegetable life. The minerals exploited include silver, iron, and phosphates, and, most important of all, placer gold. The prin. exports are gold, cocoa, phosphates, hides, woods, rosewood essence, balata,

and spices, of which gold is by far the most important; and the chief imports are Fr. wines, spirits, and liqueurs, silk and cotton stuffs, hardware, flour, and cattle. F. G. is administered by a Préfet assisted by a Privy Council. There is also a Council-General of 15 elected by Fr. citizens resident in the country. Primary education is free in lay schools. There are also a college, founded in 1936, sev. Congregational schools, and private schools.

In the 17th cent. Bertrand d'Ogeron, buccaneer chief and governor of St Christopher, won a foothold in G., but was driven out again by the Spaniards. Richelieu harboured great plans respecting G., and under his protection Chantail, from Lyons, left to explore Cayenne, and numerous Norman shipowners followed in his wake. Pierre de Brétigny settled there, only to perish at the hands of the Indians. Later the Dutch seized Cayenne. Colbert drove them out and, under the provisions of the Black Code, organised the first convoys of manpower from Senegal to G. In 1700 the Dutch again estab. themselves in G., but 2 decades later, after the loss of Acadia, the Fr., under Choiseul, sent 8000 settlers to G., but they were decimated by epidemics. Under the Restoration the Fr. freed the colony from a brief Portuguese occupation, but the emancipation of the Negroes ruined the colony. From 1853 to 1864 an attempt was made to found penal colonies in F. G., but proved disastrous. Since 1854, however, Cayenne has had a penal settlement, though no prisoners were sent there after 1927. In 1945 the pop. of the settlement was little more than 1500, and prisoners were gradually being sent back to France. There are also penal settlements on the Îles du Salut and on the Maroni R. In 1894 Capt. Dreyfus was confined on the Île du Diable. Cayenne is the cap. and chief port of the dept, which sends 1 deputy to the Fr. National Assembly. At Cayenne there are a court of first instance and a superior court of appeal, with jurisdiction elsewhere in the colony. St Laurent-du-Maroni, cap. of Inini, and Oyapoc are the 2 other chief ports. The Pan-Amer. Airways system visits Cayenne weekly. The cap. is connected by motor-car services over secondary roads with centres of pop. in the interior. There are wireless stations at the ports and at Regina. Cayenne has been colonised by the Fr. since at least 1604. Total area 34,740 sq. m.; pop. 27,863. The numbers of the native pop., which dwells in the forested interior, cannot be estimated.

The ter. of Inini includes the hinterland separated from F. G. by a decree of 1930. It is administered by a sub-préfet, as an arron. He is assisted by a small consultative council. The area is 30,301 sq. m. and the pop. 5000. Maroni is the chief centre.

French Guinea, Fr. colony on the W. coast of Africa, formerly known as *Rivières du Sud*; cap. Conakry (q.v.). F. G. lies between Sierra Leone and Portuguese G. The prin. products are

palm oil and kernels on the coast; cotton is cultivated in the higher basin, and millet, rubber, rice, coffee, bananas, pineapples, and wax are produced. Cattle, sheep, and goats are reared, and gold is found in the Sigüiri dist. The chief imports are textiles, machinery, wines, tobacco, petrol, and cement. The prin. exports are gold, hides, coffee, palm kernels, animal wax, rubber, coffee, bauxite, and iron ore. There are 2400 m. of all-weather roads, and 5000 m. of dry-season roads. Good airfields are situated at Conakry and Kankan; telegraphic and radio communications are excellent. F. G. is administered by a lieutenant-governor under the direction of the governor-general of Fr. West Africa. Geographically the colony is divided into 3 dists.—a flat coastal plain, a series of lofty plateaux, and the mountainous dist. of Fouta Djallon, where cattle are reared. In 1882 the Brit. Gov. recognised the treaty France had concluded with the lord of Fouta Djallon, and a commission settled the Fr. frontiers and those of Sierra Leone. F. G. was made a separate colony from Senegal in 1891. In 1896, following disorders, Fouta was annexed and France appointed a governor of F. G., the boundaries of which were finally settled in 1899. Total area 96,800 sq. m. Pop. 2,261,875, of which number 4637 are Fr. and 1500 Lebanese and Syrians. The chief native tribes are the Foulahs, Sousous, and Timenes. See A. Arcin, *La Guinée française*, 1906; F. Rouget, *La Guinée*, 1908; and R. Gouzy, *Vivages de l'Afrique*, 1939.

French Honey-suckle, *Hedysarum coronarium*, spreading leguminous biennial of Europe, with deep red fragrant flowers; sometimes used as fodder for horses and mules in Calabria.

French Horn, see HORN.

French India. The Fr. possessions in India were the 5 provs. of Pondicherry, Karikal, Chandernagur, Mahe, and Yanam. All have now been integrated in the Rep. of India.

French Language and Literature. *Language.*—The Fr. language is one of the Romance tongues. It is not a direct outcome of classical Lat., but of the *lingua romana rustica*, the common language spoken by the Rom. legionaries and merchants. The pre-Rom. Celtic tongue of the inhab. of Gaul d. away except in Brittany, leaving extremely few traces. It survives in a few words such as *alouette*, *sac*, *lieue*, *braie*, and influenced the form of some words of Lat. origin. The Franks who invaded Gaul during the 5th cent. had more effect upon the language, and many words are of Frankish origin, as *guerre*, *fief*, *bière*. The *lingua romana* took different forms in Fr. according to the races and environment. Two main divs. are easily made, in the S. the *langue d'oc* and in the N. the *langue d'oïl*, so called from the words used to denote affirmation. The line of div. would run approximately from La Rochelle to Grenoble, through Limoges, Clermont-Ferrand, and Lyons. Formerly it was

customary to regard the *langue d'oc* as part of the Fr. language, but it is now held to be a distinct branch of the Romance group, allied to Catalanian or Catalan (spoken in E. Spain). Both languages were further sub-divided into numerous dialects and patois. The prin. dialects of the *langue d'oc* were provençal, languedocien, dauphinois, auvergnat, and limousin, those of the *langue d'oïl* picard (Amiens and Arras), burgundian (Dijon), norman (Caen and Rouen), poitevin with angevin and saintongeais (W. France), and especially that of the Île de France, which eventually became the main tongue. Its triumph was mainly due to the accession of Hugh Capet, duke of France and of Orleans, to the throne in 987, thereby making Paris the cap. of the kingdom. Even in Rome itself in classical times there were 2 sorts of languages. There were the Lat. of Cicero and Caesar, taught and spoken by the educ., and the language of the middle and lower classes. The difference lay chiefly in the pronunciation and syntax. The tendency manifested itself to slur over and drop the unaccented syllables. Hence even in classical authors we find *sæculum, vinculum*, instead of *sæculum, vinculum*. This tendency also affected the syntax by obscuring grammatical endings, and led to the introduction of independent particles to denote grammatical relation, such as prepositions and auxiliary verbs. In Gaul classical Lat. was still learnt in the schools and affected by the higher classes, but the invasions of barbarians in the 5th cent. destroyed the culture of the country, and gave freer play to the colloquial tongue. The tendencies already remarked above were intensified. The kernel of each word was the accented syllable, which persisted, while the unaccented ones underwent modification or disappeared altogether. Vowels immediately preceding the accented syllable disappeared if short, but were preserved if long, as *claritatem, clarité; peregrinum, pèlerin*. Vowels following the accented syllable disappeared, or were reduced to *e* mute, as *mortalem, mortel; tabulum, table*. A medial consonant separating 2 vowels of which the second is accented also disappeared, or was modified, as *doldre, dour; debere, devoir*. Words from the Lat. not following these rules are of learned origin imported at later date. The simplification of Lat. case-endings soon led in *lingua romana* to the reduction of the 6 cases to 2 for masculine nouns, the nominative and accusative, and to the accusative only for feminine nouns. Thus *rosam* and *rosas* were the feminine forms in Gaulish Lat. for both nominative and accusative in the singular and plural respectively, and gave the modern forms *rose* and *roses*. The masculine *murus, murum* (singular), and *muri, muros* (plural), gave:

	<i>Sing.</i>	<i>Plur.</i>
<i>Nom.</i>	<i>murs</i>	<i>murs</i>
<i>Acc.</i>	<i>mur</i>	<i>murs</i>

The nominative disappeared from use in the 14th cent., leaving only the accusative

form *mur* and *murs*. Traces of the nominative still remain, however, in *on*, besides *homme* from *homo*, *sire*, besides *seigneur* from *senior*, and in proper names *Jacques, Georges*, etc. The Académie Française, with its 40 members called the Immortals, was estab. in 1635 and is the final authority on all matters connected with the Fr. language.

Fr. was the acknowledged language of diplomacy, and of the cultured from the days of Louis XIV, and particularly from the early 18th cent., but lost its position after the First World War. It is spoken by sev. millions of people outside the Fr. Union, in Belgium, Switzerland, and Canada.

See Joachim du Bellay, *The Defence and Illustration of the French Language* (trans. by Gladys Turquet-Milne, 1939), 1549; A. de Rivarol, *Discours sur l'universalité de la langue française*, 1784; E. Littré, *Dictionnaire de la langue française* (7 vols.), 1863-77; F. Godefroy, *Dictionnaire de l'ancienne langue française*, etc. (10 vols.), 1880-1902; M. Darmesteter, *Cours de grammaire historique*, 1891-7; K. Nyrop, *Grammaire historique de la langue française* (6 vols.), 1899-1930; P. Fouché, *La langue française dans le monde*, 1900; J. Gilléron and E. Edmont, *Atlas linguistique de la France*, 1908-20; F. Brunot, *Histoire de la langue française*, 1913; W. Meyer-Lübke, *Historische Grammatik der französischen Sprache* (2 vols.), 1913-21; E. Schwan and D. Behrens, *Grammatik des Altfranzösischen*, 11th ed. 1919; K. Vossler, *Frankreich's Kultur und Sprache*, 1929; A. Dauzat, *Histoire de la langue française*, 1930; O. Bloch, *Dictionnaire étymologique de la langue française*, 1932; A. Ewert, *The French Language*, 1933; W. von Wartburg, *Évolution et structure de la langue française*, 1946; M. K. Pope, *From Latin to Modern French*, 2nd ed. 1952.

Literature.—As already stated, the Fr. language arose from the *lingua romana rustica*. In course of time the pure Lat. language became no longer recognisable by the speakers of the *lingua romana*, and various glossaries were compiled for the aid of those who wanted to read Lat. texts. Such glossaries afford the earliest monuments of the Fr. language. The glossary of Reichenau belongs to the end of the 8th cent., and contains the Lat. words of the Vulgate with their Romance equivalents. The earliest consecutive monument of the Fr. language is the oath of Strasburg, sworn in 842 by Louis, the grandson of Charlemagne.

The literature of the 10th and 11th cents. consists of the *Séquence de Ste. Eulalie* and the *Vie de St Leger* in *assonanced* verses. The first great achievement of Fr. literature was the production of the *chansons de geste* (q.v.). These are epic poems celebrating chiefly the deeds of Charles Martel and his grandson Charlemagne. In the beginning they were assonanced, but from the 13th cent. they were rhymed. The most famous of all the *chansons de geste* is the *Chanson de Roland*, the earliest text of which is found

in the Bodleian MS. at Oxford (1080), but we know that an earlier version was sung at the battle of Hastings (1066). There is a vividness of action and a strength in the delineation of character which make the poem a masterpiece.

The *chansons de geste* gave place to the romances, which are distinguished from them by being the narration of exploits of entirely fictitious heroes, while the former, as we have seen, had always a certain historical content. The material for the romances was taken from the Celtic bards of Brittany, who sang the exploits of Arthur, the last of the Brit. kings, and his knights of the Round Table. To this theme were added such tales as the quest of the Holy Grail and the unhappy love story of Tristan and Yseult. The greatest writer of such romances was Chrétien de Troyes (d. 1195), who wrote *L'erc*, *Chigès*, *Lancelot*, *Yvain*, and *Perceval*. These poems are imbued with that feeling of chivalry and mysticism which has come to be associated with the knightly period, and were imitated throughout Europe. To this period belong also the romances of antiquity, such as the *Roman d'Alexandre*, a poem of 20,000 lines of 12 syllables which have ever since been known as Alexandrines, the *Roman de Troie* (30,000 lines) in octosyllables, *Roman d'Enias*, and *Roman de Thèbes*. As the simplicity of the *chanson de geste* yielded to the erudition of the later romances, so these in turn gave place to the elaboration of the allegory. The most celebrated of these is the *Roman de la Rose*, of which the first part was written by Guillaume de Lorris about 1230. It represents in simple, elegant, and vigorous language the feelings of a diffident lover in courting his beloved. The second part is much longer, and entirely different in its inspiration. The author, Jean de Meung, simply uses the framework left by his predecessor as a vehicle upon which to depict his witty and satirical sketches of the society of his time.

One of the most characteristic forms of Fr. literature is the *fabliau*, which came into great favour in the 13th cent. The *fabliau* is a short simple story in verse, full of pregnant reflections upon society, of wit, satire, and a certain pungent coarseness. Such poems are important as being a manifestation of the *esprit gaulois*, a term used to denote that quality of levity, raillery, satire, and gaiety which is to be found throughout Fr. literature. The *fabliaux* were preceded by collections of fables which bore the name of *ysopet*, from the celebrated Aesop. The best known of these was the *Roman de Renart*, a kind of humorous epic poem dating from the 12th cent., in which the animals are endowed with human characteristics, and the fox's cunning enables him to triumph repeatedly over his less sagacious rivals. Of the *fabliaux* the prin. are *Le Vilain Mire* (The Peasant Doctor), *Estula*, and *Les Perdrix*. The most celebrated writer of *fabliaux* was the poet Rutebeuf (d. c. 1280), who wrote many mordant satires against women, mendicant friars, the

univ. and other subjects. He is more-over worthy of note as being the first Fr. poet to introduce a deep personal tone into his poetry.

The lyrical poetry of medieval Fr. literature was an outcome of the popular song. It was to a great degree imitated from the S. nations, the Italians, and the Spaniards, and from the troubadours of the *langue d'oc*. Lyric poetry developed upon 2 lines; as regards subject it sounded in an increasing degree the personal note; in form it became enslaved more and more to certain fixed forms (ballad, rondeau, chant royal, etc.). It is not until the 15th cent. that lyric poets of enduring reputation are found. Among them must be mentioned Alain Chartier (1386-1440), called the *père de l'éloquence française*; Charles, duke of Orleans (1391-1465), whose poems are full of grave elegance and melancholy; and finally François Villon (1431-80), who gave expression to a new depth of feeling and emotion. His *Petit Testament* and *Grand Testament* relate the excesses of his life, and his *Ballade des Dames du Temps jadis* ranks as one of the finest examples of lyrical poetry.

The earliest historical works were written in Lat. Afterwards hist. was written in the form of verse such as *L'Estorie des Angles* and 2 poems by Wace, viz. *Brut* (the hist. of the Bretons) and *Itou* (hist. of the Normans). The first important prose hist. is the *Conquête de Constantinople* by Villehardouin, 1207, which is a narrative of the events of the 4th crusade. A 100 years after Villehardouin, Jean de Joinville, at the request of Jeanne de Navarre, wife of Philippe le Bel, wrote his account of the 6th crusade. Froissart is a good deal less medieval in tone than Joinville. His *Chroniques*, written towards the end of the 14th cent., deal with the events in England, France, and Flanders between 1325 and 1378. Philippe de Commines was the historian of Louis XI, of Charles the Bold, duke of Burgundy, and of the expeditions to Italy under Charles VIII. His work takes us up to the year 1498.

The drama of the Middle Ages took its rise from the Church ceremonies. The liturgy was developed by interpolation of Lat. verses and canticles, and afterwards by recited pieces, which finally became amplified into such liturgical dramas as *Les Pasteurs* and *Les Vierges sages et les vierges folles*. Here the Lat. tongue gradually gave way to the native language, and as the scope of the pieces increased they were removed from the choir to the porch of the church. The *Jeu d'Adam* (12th cent.) was the first piece played outside the church. In the 13th, 14th, and 15th cents. arose the miracle plays dealing with the lives of the saints, mystery plays concerned with scriptural subjects and certain epic events of profane hist., such as the siege of Troy and that of Orleans. These mysteries often ran to enormous lengths, requiring as many as 100 performers, and sev. days for their presentation. In 1548 they were banned by the

Parlement de Paris on account of their increasing profanity, but they lingered on elsewhere until the end of the 16th cent.

The rise of Fr. comedy is very obscure. It appears to have developed from the *dits*, *monologues*, and *débats* that the wandering minstrels carried from castle to castle. The first known comedy is the *Jeu de la feuille* by Adam de la Halle, played in 1262 in Arras, while another, *Robin et Marion*, by the same author, a pastoral play with a musical accompaniment, was played in Naples in 1285. In the 15th cent. many societies were formed for the presentation of farces, pantomimes,

borrowing from the various dialects. Unfortunately the less-known poets and their imitators carried these ideas too far and brought ridicule upon the school, which led to the eclipse of the fame of Ronsard. Ronsard during his life was regarded as the greatest of Fr. poets, and his sonnets are of considerable merit (see RONSARD). Du Bellay lacked the variety and force of Ronsard, but was more sincere in his verse. His best poems are contained in *Regrets*, *Antiquités de Rome*, and *Jeux rustiques*. Beileau wrote pastorals in his *Bergeries*, and du Bartas, a disciple of the Pléiade, a pretentious work, *La Semaine*, describing the creation of the world, according to the biblical tradition. Agrippa d'Aubigné (1550-1630), another disciple of the Pléiade, a Protestant, wrote *Les Tragiques*, 1616, a succession of descriptive tableaux dealing with the misery and corruption of the world and with the final judgment.

François Rabelais (c. 1490-1553) is a writer whose exact merit it is difficult to assess. B. at Chinon, he was first a monk and then a doctor. His masterpieces are *Gargantua* and *Pantagruel* (see RABELAIS).

The Renaissance led naturally to the trans. of the ancients, and Amyot's trans. of Plutarch, 1559, is specially worthy of mention. Henri Estienne furthered the knowledge of Greek and at the same time defended the language against the influx of It. words. Montaigne (1533-92) was among the first prose writers of his century. His *Essais* offer an inexhaustible wealth of information upon the varied customs of mankind (see MONTAIGNE).

The drama of the 16th cent. did not show any strong individuality. It consists almost entirely of trans. from Gk. Lat., and It. sources. In 1552 Jodelle produced *Néopâtre*, the first original tragedy in Fr. Lariève wrote some dozen comedies adapted from the Italian, but wholly Fr. in spirit; and he may be regarded as the forerunner of Molière. Among the historians of the period mention should be made of Brantôme (1540-1614), whose *Mémoires* contain 'Vies des hommes illustres et des grands capitaines' and 'Vies des dames illustres.' He wrote with vigour, wit, and cynicism. Blaise de Montluc (1502-77), one of the foremost soldiers of his time, was the author of the *Commentaires de Messire Blaise de Montluc*, 1592. D'Aubigné, mentioned above, wrote *L'Histoire universelle*, a Fr. hist. from the Protestant standpoint from 1550 to 1601. Among religious works foremost is Calvin's *Institution chrétienne*, 1541, the Fr. version of his Lat. work of the same title. It is important as being the first religious work written in the Fr. language. François de Sales's *Introduction de la vie dévote*, 1608, also belongs to the 16th cent. by its style.

During the 17th cent. Fr. literature reached its zenith. The progress was not, however, greatly marked in the realm of poetry. The outstanding figure is Malherbe (1555-1628), a zealous opponent of all exaggeration. He insisted upon the use of words of undoubted Fr. origin, and



RONSARD (1524-85)

moralties, and *sotties*, such as *Les Clercs de la Basoche* and *Les Enfants sans souci*, in Paris. Of the farces the most celebrated is *L'Avocat Patelin*, 1470, of unknown authorship, which was modernised in 1872 and is still performed.

The 16th cent. ushered in the Renaissance of Fr. literature. The early renaissance found its most complete expression in Queen Marguerite of Navarre. She was the author of *Heptameron*, 1558, an imitation of Boccaccio's *Decameron*. Outstanding among the poets who enjoyed her patronage was Clément Marot (1497-1544), a courtier who produced some very elegant pieces and some *épîtres* which are of deeper inspiration.

In 1549 appeared Joachim du Bellay's *Défense et illustration de la langue française*, which set out the tenets of the new reforming party of Fr. poets. These poets grouped themselves round Ronsard, and were known as the Pléiade (q.v.). They endeavoured to give France a worthy literary language by imitating from the classics, by coining new words, and by

based his verse on the severest models, and thereby founded the classical school.

The classical movement was helped by sev. causes. In 1637 Descartes pub. his *Discours de la méthode*, the first Fr. book upon a philosophical subject. Indirectly the work had a great effect upon Fr. literature. Its theories appealed to Fr. minds, and all the writers of the century were imbued with Cartesian tenets. The unity of the language was further promoted by the estab. of the Fr. Academy, founded by Richelieu in 1634. Another influence upon Fr. literature in the 17th cent. was the famous *salons*, principal among which was the Hôtel de Rambouillet. The result was a refinement of language, a striving after elegance, which subsequently degenerated into affectation or *préciosité*. Vaugelas (1585-1650), one of the early members of the Academy, who had the reputation of knowing his own language better than any one and whose decisions were looked upon as laws, pub. his *Remarques sur la langue française* in 1647. Another prose writer of the period was J. L. Balzac, *le grand épistolier* (1594-1654), whose letters had a wide popularity and were regarded as models of style. Vincent Voiture (1598-1648), poet and letter-writer, was greatly admired in his day, and was for some 20 years the leading spirit of the Hôtel de Rambouillet.

The 17th cent. produced the 3 supreme dramatists of France, Corneille, Racine, and Molière (qq.v.). The first dramatist of the century was Alexandre Hardy (1569-1630), a prolific writer who produced some 700 or 800 plays, of which 40 have come down to us. Though not a great playwright, he nevertheless had a keen sense of dramatic effect, and knew how to marshal his scenes and to set off his characters. After Hardy came Jean de Mairet (1604-86), whose tragedy *Sophonisbe* is remarkable as being the first tragedy which strove to give effect to the unities of time, place, and action.

Pierre Corneille (1606-84), b. at Rouen, produced his first play, *Mélite*, a comedy, in 1629. In 1636 *Le Cid* was produced. Its success was immense, and surpassed that of any previous play. In 1640 Corneille produced 2 plays, *Horace* and *Cinna*, and in 1643 *Polyeucte* and *Pompée*, as well as a very successful comedy, *Le Menteur*. Between 1642 and 1652 he wrote *Rodogune*, *Théodore*, *Héraclius*, *Nicomède*, and *Pertharite*. His characters show great firmness and heroism; he portrayed men as they ought to be, not as they are (see CORNEILLE).

Corneille was ultimately overshadowed by Jean Racine (1639-99). In 1667 he produced *Andromaque*, which achieved a great success, and between that date and 1677 sev. other tragedies, *Britannicus*, *Bérénice*, *Bajazet*, *Mithridate*, *Iphigénie*, and *Phèdre*, as well as a comedy *Les Plaideurs*. Unlike Corneille, he presents not the moral qualities but the emotions and passions of his characters (see RACINE).

Fr. comedy before Molière was represented by *Le Menteur* of Corneille and

works by J. Rotrou (1609-50) and P. Scarron (1610-60), imitated from the Spanish and Italian. Jean Baptiste Poquelin, alias Molière (1622-73), founded in 1643 *L'illustre Théâtre*, but was forced by want of success to tour in the prov. from 1645 to 1658. In the latter year he came to Paris, where he produced *Les Précieuses ridicules*, 1659, which estab. his reputation, and then successively *L'école des Maris*, 1661, *L'école des Femmes*, 1662, *Tartuffe*, his masterpiece, 1664, *Don Juan*, 1665, *Le Misanthrope*, 1666, *Le Médecin malgré lui*, 1666, *Les Femmes savantes*, 1672, and *Le Malade imaginaire*, 1673. The influence of Molière in comedy has been immense, greater by far than that of any other writer developing this particular branch (see MOLIERE).

Blaise Pascal (1623-62) was one of the foremost prose-writers of the 17th cent., and in reading him we feel that we have at length arrived at modern Fr. prose. He was a member of Port-Royal, the stronghold of Jansenism (q.v.). His first work, *Les Provinciales*, 1656, is a series of letters against the Jesuits. After his death were pub. his *Pensées*. He closely follows Montaigne in observing the uncertainty of human endeavour, but concludes that the sole refuge for thinking persons is in an absolute faith in God (see PASCAL). The 17th cent. also marked the zenith of the sermon. The 3 great preachers are Jacques Bénigne Bossuet, bishop of Meaux (1627-1704), Louis Bourdaloue (1632-1704), and Jean Baptiste Massillon, bishop of Clermont (1663-1742).

The increase of social intercourse called forth many works dealing with human manners and motives. The most celebrated moralist of the century was François de la Rochefoucauld (1613-80), who pub. his *Mémoires* in 1662 and his *Maximes* in 1665. In the latter he tries to show all human actions to be inspired by self-interest and vanity; his style is terse and antithetical. Jean de la Bruyère (1645-96) was less systematic than his predecessor; his *Caractères*, 1688, show deep penetration and a considerable tinge of misanthropy.

Of the great number of letter-writers of this period it suffices to mention Mme de Sévigné (1626-96), whose letters to her daughter, written in a sprightly and natural style, reveal to us not only her own emotions, but the hist. of the period, and Mme de Maintenon (1635-1719), second wife of Louis XIV, whose letters deal with the education of her young charges at St. Cyr. Memoir-writers are Mme de Motteville, who gives a simple and sympathetic account of the career of Anne of Austria; Cardinal de Retz, the historian of the Fronde; and Saint Simon, who, disappointed as a courtier, has left an account of the court of Louis XIV which is remarkable for the malignity of the portraits of his enemies.

The novel of the 17th cent. was generally an affected tale of chivalrous adventure. Best remembered are Honoré

d'Urfé's *L'Astrée*, 1627, a pastoral romance, and Mlle de Scudéry's *Le Grand Cyrus*, 1648.

The most typical Frenchman of the period was Jean de la Fontaine (1621-85). He pub. a book of *Contes* in 1664, and in 1668 the first 6 books of *Fables*, narrating episodes between various animals and full of penetrating reflections upon human life (see LA FONTAINE).

Nicolas Boileau (1636-1711) was the apostle of classicism. His work is mostly critical, and for more than a century his opinions were regarded as authoritative. His prin. work, *L'Art poétique*, codifies the usage of the great writers, and advocates the imitation of the ancients. In this he was opposed by the modernists, who, led by Charles Perrault, maintained that the age of Louis XIV had surpassed the finest achievements of ancient classical literature. Both sides in the dispute showed lack of critical judgment, but the modernists gained the day, and classical influence gradually waned. François Fénelon (1651-1715), archbishop of Cambrai, is well known as a prose writer. His *Education des Filles*, 1689, gives excellent advice upon the upbringing of girls. His *Télémaque*, 1699, is a didactic work, written for his refractory pupil, the duke of Burgundy. His *Explication des maximes des saints* embroiled him with Bossuet and led to his disgrace.

In the 18th cent. Fr. literature freed itself from court influence. Louis XIV d. in 1715, and after his death began the struggle against central authority that ended in the revolution. Literature as such made no great advance, the originality of the age being shown more in historical, scientific, and sociological research. The 2 connecting links between the old and new centuries are Bernard Fontenelle (1657-1757) and Pierre Bayle (1647-1706). The former became the populariser of scientific knowledge in his *Entretiens sur la pluralité des mondes* and his *Éloges des Savants*. The latter was the precursor of the encyclopaedists. His *Dictionnaire historique et critique*, 1697, was one of the indispensable handbooks of the 18th cent. Charles Montesquieu (1689-1755) is the first great writer of the 18th cent. His earliest work, *Lettres persanes*, 1721, is a brilliant and piercing satire on Fr. society and institutions. *De l'esprit des lois*, 1748, is an objective study of the various systems of legislation (see MONTESQUIEU).

Georges Buffon (1707-88) wrote from 1749 till his death his *Histoire naturelle* and *Époques de la nature*, which anticipated later discoveries.

The great name of the century is undoubtedly that of François Voltaire (1694-1778). Though his writings are not perhaps now widely read, his influence lives on. He turned his attention to many branches of literature and stands high in them all (see VOLTAIRE).

The *Encyclopédie* appeared from 1751 to 1772. It was begun by Diderot, who enlisted the collaboration of many distinguished writers. Though the gov.

attempted to hinder the work it was successfully pub., and contributed to the defence of political and intellectual liberty.

The theatre made little progress during the 18th cent. Jolyot de Crébillon (1675-1762) wrote horrific but vigorous tragedies. Jean François Ducis (1733-1816) is noted for his trans. of Shakespeare, and Voltaire's plays were performed with great success. The Molière tradition was continued by Jean François Regnard (1655-1709), Florent Dancourt (1661-1725), and Alain Lesage (1668-1747). The comedies of Pierre Marivaux (1688-1763) were of quite an original character. His prin. plays are *La Surprise de l'amour*, 1722, *Le Jeu de l'amour et du hasard*, 1734, and *Les Fausses confidences*, 1737. Pierre de Beaumarchais (1732-99) is famous for 2 plays, *Le Barbier de Séville*, 1775, and *Le Mariage de Figaro*, 1784. They are full of taunts at the nobility, and reflected exactly contemporary feeling.

After Voltaire the most influential writer of the century was Jean Jacques Rousseau (1712-78). His *Discours sur l'origine de l'inégalité parmi les hommes*, 1751, is the first manifesto of Communism. Rousseau's daring and original thoughts upon society directly influenced the revolution (see ROUSSEAU). His splendid descriptions of nature and his outpourings of personal feeling are among the prin. sources of that flood of romanticism which was to rise in the following century. His chief literary disciple was Bernardin de St Pierre (1737-1814), who wrote *Paul et Virginie*, 1789, a touching story of boy and girl love, full of splendid pictures of nature.

The best novelists of the 18th cent. were Alain Lesage, Pierre Marivaux, and the Abbé Prévost. Lesage wrote 2 works, *Le Diable boiteux*, 1707, an imitation from the Spanish, and *Gil Blas* 1715-35, an original novel whose scene is laid in Spain. Marivaux wrote the novels *La Vie de Marianne*, 1731-41, and *Le Paysan parvenu*, 1735-6. They resemble his comedies mentioned above. L'Abbé Prévost is the author of *Manon Lescaut*, 1732, a passionate love romance.

Turning to lyric poetry we find it represented at the beginning of the century by Jean Baptiste Rousseau (1671-1741), who was held for some time to be the greatest Fr. lyrical poet. Écouchard-Lebrun, nicknamed 'Lebrun Pindare,' wrote odes after the style of Pindar, notably *Le Vengeur*, c. 1800. André Chénier (1762-94), an unfortunate victim of the revolution, wrote elegies, bucolics, and idylls, which are modelled upon the Greek, and breathe the very odour of classical charm (see CHÉNIER).

In the 19th cent. sev. important movements manifested themselves in Fr. literature. The first is the Romantic movement, which took place between 1815 and 1850. The underlying principle of romanticism is the expression of individuality.

First of the romanticists is François de 'hateaubriand (1768-1848), whose prin.

works are *Atala*, 1801, *Le Génie du christianisme*, 1802, and *René*, 1805 (see CHATEAUBRIAND). Mme de Staël (1768-1817) brought Shakespeare into the ken of the Fr. nation by her work *De la Littérature*, 1800, and turned Fr. thought into a new channel by *De l'Allemagne*, 1810. Alphonse de Lamartine (1790-1869) was the first romanticist to develop the lyrical strain of poetry. Victor Hugo (1802-85) has greater claims to be held as the chief of the romanticists. He used every variety of metre, and revelled in an inexhaustible vocabulary. Hugo's attempts to revolutionise the drama were not successful. His novels, *Notre-Dame de Paris*, 1831, *Les Misérables*, 1862, *Les Travailleurs de la mer*, 1865, are too crowded and exuberant, though of great descriptive power (see HUGO). Alfred de Vigny (1797-1863) writes of the cruelty of nature and the indifference of God. His best poems are *La Colère de Samson*, *La Mort du loup*, and *La Bouclée à la mer*.

Alfred de Musset (1810-57) has a great hold upon Fr. hearts. His poems tell of the regrets of love, and are inexpressibly tender and sad. Best among them are *Les Nuits*, 1835. His dramas rank high in the list. of the Fr. stage (see MUSSET).

During the middle of the century arose the Parnassian school of poetry, whose leader, Théophile Gautier (1811-72), formulated the doctrine of *l'art pour l'art*. Gautier pub. his poems under the title of *Émaux et camées*, 1852, which well characterised the style of his work. His prin. followers were Leconte de Lisle (1820-94), José de Heredia (1842-1906), and Charles Baudelaire (1821-67). Sully Prudhomme (1839-1908) is the most philosophic of Fr. poets, and has a very clear and smooth style. François Coppée (1842-1908) was the poet of mean life. Paul Verlaine (1844-96), with Stéphane Mallarmé (1842-98), founded the symbolist school of poetry, suggestive, and at times obscure.

Hist. and literary criticism showed great virility in the 19th cent. The prin. critics were Abel Villemain (1790-1870), who inaugurated comparative and historical criticism; Augustin Sainte-Beuve (1804-1869), author of *Port-Royal*, 1840-60, *Portraits littéraires*, 1844-52, and *Les Lundis*, 1850-60; and Hippolyte Taine (1828-93). Among historians the most celebrated are Augustin Thierry (1795-1856), whose theory of the rivalry of race is propounded in *La Conquête de l'Angleterre par les Normands*, 1825, and *Le Tiers État*, 1853. François Guizot (1787-1874) studied hist. in a philosophic spirit and paid special attention to it as a social science. Adolphe Thiers (1797-1877) is extremely well-informed, industrious, exact, and clear. His 2 great works are *L'Histoire de la Révolution française*, 1823-7, and *L'Histoire du Consulat et de l'Empire*, 1845-62. Jules Michelet (1798-1874) is distinguished by the poetical quality of his historical writings, which, however, gradually got the better of his historical judgment. Fustel de Coulanges

(1830-89) is the greatest representative of the scientific method of treating hist.

Of the writers of comedies Augustin Eugène Scribe (1791-1861) was the most prolific, producing some 400 pieces. He is an admirable constructor of plots and has a mordant wit. Émile Augier (1820-1889) distinguished himself as the defender of morality and the family. *Le Gendre de M. Poirier*, 1854, is his best-known comedy. Victorien Sardou (1831-1908) was a disciple of Scribe. Alexandre Dumas fils (1824-95) wrote paradoxical comedies, dealing chiefly with marriage and divorce. With Edmond Rostand (*Cyrano de Bergerac* and *Chantecler*) the comedy has again turned towards idealism and poetry.

As regards novelists, George Sand (1804-76) was a prolific female author, who wrote successively romantic, socialist, and pastoral novels (see GEORGE SAND). Stendhal (1783-1842) wrote novels of a psychological and realistic character, such as *Le Rouge et le noir*, 1831, and *La Chartreuse de Parme*, 1839. Honoré de Balzac (1799-1850) is the greatest of Fr. novelists. He is the most fertile creator of types, and excels in delineation of character. His collection of works is called *La Comédie humaine* (see BALZAC). Gustave Flaubert (1821-80) originated the realistic school by his *Mme Bovary*, 1857, which was followed by a historical romance, *Salammbô*, 1862, a story of Carthage. The greatest writer of the naturalist school was Émile Zola (1840-1902), whose style if sometimes tinged with vulgar brutality is yet robust. Guy de Maupassant (1850-93) excelled in the short story. Alexandre Dumas père (1803-70) wrote romantic novels such as *Les Trois Mousquetaires*, 1844, and *Le Comte de Monte-Cristo*, 1841-5. Prosper Mérimée (1803-70) wrote sev. novels in sober and concise style, best known of which is *Colomba*, 1840, the story of a Corsican vendetta. Jules (1830-70) and Edmond Goncourt (1822-96) wrote in collaboration. They are scrupulously exact in their observation. Alphonse Daudet (1840-97) is a humorist whose best character is the celebrated Tartarin of Tarascon.

Summary of French Literature after 1870.—The period of the Third Republic (1870-1940) had but little to do with politics; and in the domain of pure literature the Fr. nation during this disturbed period achieved much. One outstanding name in the period is that of Valéry (1871-1945) who, in 1940, was the official poet of the Third Rep. (see VALÉRY). Paul Claudel represented in this period the important Catholic revival, he having been himself converted in 1886 (see CLAUDEL). The failures of Catholicism became the subject of literary essays by Léon Bloy (1846-1917), Péguy and Georges Bernanos (1888-1948); but the most reliable critics deny that a single great work of art came out of the Catholic revival; for Jules Lemaitre (1853-1914), Maurice Barrès (1862-1923), though Catholics in name, were really sceptics,

while Charles Maurras and Ferdinand Brunetière (1849-1906) did not even make a pretence of believing. With the commercialisation of the novel came the limitations incidental to mass production and the search for popularity. Among the best-sellers of the period in this kind were René Bazin (1853-1932), Paul Bourget (1852-1935), Abel Hermant, and Marcel Prévost. None of these, however, could write with the brilliant objectivity of Pierre Loti (1850-1927); and over all towered the figure of Anatole France (1844-1924), whose novels are admirable exercises in irony and compassion (see ANATOLE FRANCE). Romain Rolland (1866-1944) is important chiefly for one



ANATOLE FRANCE

work, the 10-vol. novel *Jean Christophe*, 1904-12, written as a direct reaction to Nietzsche's superman and ethic, and by way of an attempt to reconcile and unite France and Germany (see ROLLAND). Among literary critics of the period may be named Émile Faguet (1847-1916), notable for his works on the 17th cent.; Ferdinand Brunetière (1849-1907), one-time master of the *Revue des Deux Mondes*, and a scientific materialist; Jules Lemaitre (1853-1914); Rémy de Gourmont (1858-1915), whose criticism is warped by his democratic ideology, though he was the guiding spirit of *Le Mercure de France*; Charles Péguy (1873-1914), known for his great work on—almost by way of rehabilitation of—Victor Hugo; Léon Daudet (1867-1942), and Charles Maurras, who together produced *L'Action française*, but whose political theories destroy much of value in their work. Essayists of the period include Émile Chartier Alain, who writes in the spirit of revolt against authority, as in *Mars ou la guerre jugée*, 1921; Henri Bremond (1865-1939), whose *Histoire littéraire du sentiment religieux*, 1916, put a new complexion on the age of Louis

XIV; Jacques Maritain, whose *Art et scolastique*, 1930, is a classic of erudition; and Julien Benda, the critic of Bergson.

Fr. novelists of the early 20th cent. are so varied in their outlook that they can hardly be classified. Jules Romains (1885-), primarily a poet of the *groupe de l'Abbaye*, is chiefly famous for his remarkable 27-vol. novel, *Les Hommes de bonne volonté*, 1932 ff.; but his earlier fine comedy, *Knock*, 1923, a social satire on the medical profession, was a success, also as a film. André Gide (1869-1951) exercised a deep influence on the first half of the 20th cent. by his intellectual curiosity, outspokenness, and absolute sincerity (see GIDE). Jules Supervielle (1884-) is of the modern school, but without pessimism, as is illustrated in his *Le Forcat innocent*, 1930. Pierre Hamp invented a new type of novel without a hero, spun on an industrial theme, yet entirely human. Other names are those of Jean Richard Bloch; Eugène Montfort, writing novels of his life in the vein of Zola, but still more pronounced; Joseph Rosny, whose stories are really allegories; Alain Fournier, whose chief note is fantasy; Roland Dorgeles; Paul Morand, who exploits the amoral mentality of post-war life; Jean Giraudoux (1882-1944), writer of fantastic dreams and an important dramatist; Jean Schlumberger (1877-), whose *Saint-Saturnin*, 1931, a picture of the domain family life of Normandy, is one of the best novels of the times; Marcel Jouhandeau (1888-), subtle and sadistic in treatment; Jacques de Lacretelle; the Catholic novelist Georges Bernanos (1888-1948), known especially for *Le Journal d'un curé de campagne*, 1936; and François Mauriac (1885-), novelist of the Catholic bourgeoisie and of the Christian problems of the soul.

One of the most popular novelists of the first half of the century was Colette. Other novelists of importance, besides those already mentioned, particularly Gide, Mauriac, Romains, and, of the younger generation, Camus (qq.v.), are Roger Martin du Gard (1881-), Georges Duhamel (1884-), André Maurois (1885-), Jean Giono (1895-), Julien Green (1900-), Raymond Queneau (1903-), and the Fr.-Swiss realistic writer Charles-Ferdinand Ramuz (1878-1947). The realistic and political novels of André Malraux asserting a 'tragic humanism,' deal with the author's experience in the Chinese Revolution of 1926 (*Les Conquérants*, *La Condition humaine*), in the Sp. Civil war (*L'Espoir*, 1937), and in the Fr. Resistance movement (*Les Noyers d'Altenburg*, 1948). Malraux later specialised in essays on fine arts (*Psychologie de l'Art*, 1947-50). André Chamson (1900-), of the Protestant tradition, and also a member of the Resistance during the war, often used political and social events as the background to his novels (*La Galère*, *La Neige et la Fleur*). Another writer who utilised his experience in his novels was the aviator Antoine de Saint-Exupéry (1900-44). Henri de Montherlant (1896-) has turned from the novel to

the theatre (*La Reine morte, Le Maître de Santiago, Port-Royal*); Georges Simenon (1903-) became popular through his detective stories, many of which have been trans. into Eng. Jean Anouilh (1910-) enjoys a great popularity as a dramatist; Marcel Aymé (1902-) is known for his humorous novels and plays. Marcel Pagnol (1895-), whose trilogy *Marius, Fanny, Cécile* were successes before the Second World War, had turned to the cinema in the later 1930's.

Among poets, and former members of the surrealist movement, who achieved fame are Louis Aragon (1897-) and Paul Eluard (1895-1952), who passed from surrealism to an idealistic communism; Jean Cocteau (1889-), combined surrealism with his own brilliant fantasy; André Breton (1896-) may still be regarded as the leader of the movement, to which also belong Julien Graoq (1909-) and, more loosely perhaps, Henri Michaux (1899-). A school of 'Neo-Surrealism' was created in the late 1940's, attracting a number of younger writers, though no really outstanding poet since Valéry has yet emerged. Jacques Prévert (1900-) is known for his humorous fantasy and original free verse (*Paroles*, 1946, *Spectacle*, 1951); others that deserve mention for their individuality are Audiberti (1899-), René Char (1907-), Aimé Césaire (1913-), and Pierre Seghers (1906-); the last-named is also a publisher concentrating on 20th-cent. poetry (*Poètes d'aujourd'hui*). Poetic realism is found in Jean Follain and Gullievic. Catholic poets, each strongly individual, include Jean Cayrol, Luc Estang, Patrice de la Tour du Pin (all b. 1911), and Pierre Emmanuel (1918-). Among the Existentialists are Jean Wahl (1888-), Georges Bataille (1897-), Francis Ponge (1899-), André Frénaud (1907-), and Jean Grosjean (1912-).

Whilst Gabriel Marcel (1889-) represents the Christian side of Existentialism, the intellectual leader of atheistic Existentialism is Jean-Paul Sartre (1905-), who expounded his philosophy in his work *L'Être et le Néant*, 1943 (trans. under the title of *Being and Nothingness*, 1957), and popularised it in his novels (*Les Chemins de la liberté*), essays and lectures (*Existentialism and Humanism*), and plays. Similar ideas are to be found in the works of Maurice Merleau-Ponty (1908-). Another exponent of Existentialist writing is Simone de Beauvoir (1908-), whose novels *Le Sang des autres*, *Tous les hommes sont mortels*, and *Les mandarins* have become successes. To this group may be added the poet and playwright Jean Genet (*Les Bonnes, Le Balcon*) as well as Eugène Ionesco. Existentialism, however, already has its strong critics, from such diverse elements as rationalists, Catholics, and orthodox Marxists.

Albert Camus, dealing with the problem of the individual in *L'Étranger*, turned to man's fate as part of a collectivity (*La Peste, L'homme révolté*). In 1956 appeared *La Chute*, a novel on human distress.

A great number of Fr. writers turned to

politics during and after the Second World War, notably to Marxism, which left its mark in their works (Sartre, Aragon, Eluard, Lefebvre, Tristan Tzara, Aimé Césaire, and others). Sartre's *Les Mains sales*, 1948, is a political play about the responsibility for the assassination of a party leader; his *Nekrassov*, 1955, is a satire on the fear of Communism in the middle classes in France, and the distorted news in the influential press.

Although some intense nihilistic trends can be felt in recent Fr. literature, of which the controversial plays of the Irish-born Samuel Beckett (*En attendant Godot, Fin de partie*) are characteristic, there is also a tendency to go back to spiritual values, and to search for new approaches, trying to detach again philosophy and politics from literature.

Among the young generation, the novelist Françoise Sagan (1935-) had a startling success with *Bonjour tristesse*, 1954, which was followed by the novels *Un certain sourire*, 1956, and *Dans un mois, dans un an*, 1957.

See also BELGIUM, Literature; CRITICISM, LITERARY; PROVENÇAL LANGUAGE AND LITERATURE. For greater detail of Fr. drama see DRAMA. See also the articles on individual authors and subjects.

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Park (ed.), *The Culture of France in Our Time*, 1954; L. Cazamian, *A History of French Literature*, 1955; A. J. Steele (ed.), *Three Centuries of French Verse, 1511-1819*, 1956.

French Music. Although in France M. as a consciously cultivated art never held the pre-eminence of the Netherlands in the 15th cent., Elizabethan England, 16th and 17th cents., Italy or Germany and Austria between about 1700 and 1900, the Fr. school is by far the earliest to exert an influence and to command the attention of historians. Like other countries, but more conspicuously than any, France cultivated folksong and instrumental dances long before such things were fixed for posterity in musical notation; and musical art-forms arose before they could be ascribed to any individual composers, although they were clearly contrived by practising musicians according to definite principles. The 12th- and 13th-cent. troubadours in the S. of France and trouvères in the N. were certainly composers as well as poets and performers. They sang their songs probably, but not certainly, with instrumental accompaniment. The chief vocal forms of the period were the *lai*, set to a poem in pairs of stanzas, and the *rondeur*, *virelai*, and *ballade*, all of which had refrains, like round-dances; an actual dance played by instruments was the *estampie*, or *estampida* of Provence. The last of the trouvères, Adam de La Halle, used music of this type for a pastoral play, *Le Jeu de Robin et de Marion*, produced about 1275-85, which in a sense was an early anticipation of opera. Instrumental M. was also played by itinerant jugglers and, of course, by any musicians who gave their services to both folk and courtly dancers. The M. of the dances developed various forms, some of which still survive in instrumental M.

So far F. M. had been restricted to single melodic lines: the unaccompanied plain-song of the Church, the possibly accompanied songs of the minstrels, and the simple, symmetrical dance-tunes. But in the second half of the 12th cent. and the first of the 13th a rough kind of polyphony (q.v.) arose, known as *ars antiqua*, the chief Fr. centre of which was the school of Notre-Dame in Paris. This fl. for 2 generations, the former under the first great individual master of F. M., Léonin, the latter under his equally great successor, Pérotin. They began to combine different melodies where formerly plain-song tunes had been merely doubled at the intervals of an octave and a fourth, and by the time the school had reached its apex, it had discovered the use of canon. More and more elaborate settings of liturgical texts thus developed the motet (q.v.), as yet in a primitive form.

The outstanding master of the 14th cent., Philippe de Vitry, did much to undermine the medieval modes (q.v.) and work towards the modern major and minor scales. At this time new secular forms like the *rota* (round) and the *chasse* (a song in canon, equivalent to the It. *caccia* and the Eng. *catch*) arose, and with

them and other secular forms the *ars antiqua* gave way to the *ars nova*. The great contemporary of Vitry was the slightly younger Guillaume de Machaut; both consolidated polyphonic Church M. in masses and motets and brought the popular vocal forms of the troubadour age to maturity, and in fact to the verge of decay, by over-elaboration in part-writing.

The 15th cent. is dominated by the Netherlands school which developed polyphonic Church M.; in France the important Burgundian school relied largely on Flem. composers, with Binchois and Dufay at their head. But early in the next century a secular polyphonic type that was peculiarly Fr. reached its full maturity—the *chanson* for sev. voices or 1 voice with instruments—which wove light melodic material into an airily elaborate texture and in the hands of its most characteristic master, Jannequin, introduced realistic imitations of various non-musical sounds, such as the noises of a battle. By 1570, when the poet Antoine de Baif founded an Académie de Poésie et Musique, words had become so important that the metres of verse imposed their patterns on the musical rhythm in a new type, the *chansonnette mesurée*, where long and short notes served not so much to form melodies as to follow the quantities of Fr. poetry. *Airs de cour* and *chansons à boire* became fashionable at this period. So also did lute M., of which Denis Gaultier was the greatest representative. The Reformation left little mark on Fr. church M., but the Huguenots Goudimel and Louis Bourgeois made important contributions to the Protestant psalter. Towards the end of the 16th cent. came Titelouze, the first master of organ M., which was to become a special feature of F. M.

In 1581 a stage entertainment, *Le Ballet comique de la reine*, distinctly pointed forward to a new 17th-cent. type, the *ballet de cour*. This developed out of earlier tourneys and masquerades and was soon to turn into the opera-ballet, a characteristically Fr. form, to which the influence of It. opera also contributed and which was to dominate the stage for a long time, cultivated by Lully and many others, and carried into the 18th cent. by Rameau. (See also under BALLET and OPERA.) But both these masters, as well as Cambert, Colasse, Campra, Desmarests, Montéclair, and Destouches, also wrote pure operas; in these, however, a spectacular element akin to that of the ballet was retained, and the M. was divided into short airs, choruses, and dances, linked with long stretches of recitative in which the dialogue was carried on with a good deal of care for the natural declamation of words rather than for musical interest. In the church a new type of motet, much less contrapuntal than that of earlier times and rather in the nature of operatic choruses, was cultivated by Marc-Antoine Charpentier, Lalouette, Lalande, and the great Couperin; this last is also the outstanding representative of the school of harpsichord composers

who are the most striking Fr. creative musicians of the 17th cent. The school included Chambonnières, who came so early as to be almost isolated and was followed by Le Bègue, d'Anglebert, Couperin, Clérambault, Dandrieu, Rameau, Dagincourt, Daquin, and Dauvergne. Marais, Forqueray and some others represented the end of the period of cultivation of the viol.

This gave place in the 18th cent. to an admirable school of violin playing and composition, the traditions of which were never forgotten. Senaillé, Leclair, Francœur, Baillet, and Rode were among the composers for this instrument. Opera continued successfully, but the mythological and heroic subjects of the preceding century now gave way to an increasing interest in real human beings, treated either humorously or sentimentally. Mondonville still adhered to the older type, but men only a little younger than he, like Philidor and Monsigny, favoured the newer comic opera, which before long shared the operatic stage with the *comédie larmoyante*, in which the characters were treated with an affectionate compassion, if often given rather thin M. by such composers as Grétry, Dezède, or Dalayrac. One composer of this group, Duni, was of It. origin; Grétry and Gossec were Belgians; and the Swiss Jean-Jacques Rousseau contributed to the Fr. stage pieces as slight as the Eng. ballad opera. It may be noted here that later on foreign composers (Gluck, Cherubini, Meyerbeer, Rossini) were to make notable contributions to Fr. opera, to the point of influencing its development. Later in the 18th cent. opera became more grandiose again in the hands of Cherubini, Lesueur, Méhul, and Catel, without however losing its concern with human beings, and by the time of the Revolution it had developed into the humanitarian 'rescue opera', of which Cherubini's *Les Deux Journées* is the finest and Gaveaux's *Leonoré* the most typical example, if only because its libretto became, trans. into German, that of Beethoven's *Fidelio*. That musically also Beethoven was influenced by Fr. opera of this kind is evident from Cherubini's and Méhul's works. Lesueur, Méhul, Catel, and especially Gossec did much to advance the art of orchestration, sometimes in an enterprisingly experimental way that points forward to Berlioz.

In the 19th cent. opera split up into 2 new types, *grand opéra* and *opéra-comique*. The latter was charmingly cultivated by Boieldieu, Isouard, Auber, Hérold, and others, and did not deteriorate artistically, though it became even lighter, in the operettas of Leococq, Audran, Planquette, and Messager. But the masters of Fr. operetta, of a peculiar satirical kind, as well as that of *grand opéra* at this time, were once again foreigners, the Ger. Jews Offenbach and Meyerbeer. A quite new development of *opéra-comique* came with one of the supreme masterpieces of all opera, Bizet's

Carmen, in 1875. Berlioz's *Les Troyens* was a new departure in the heroic type, but the lyrical grand operas of Ambroise Thomas, Gounod, Saint-Saëns, and Massenet had not enough grit or taste to exercise a wholesome influence. A valuable offshoot of comic opera, in a sense, were the ballets of Delibes. More remarkable than the developments of opera in the 19th cent., because less expected, were the advances made in instrumental M. and song. Another alien, the Belgian César Franck, had an influence on orchestral M. with his symphony, and he both carried on the Fr. organ school and gave new impetus to chamber M. by demonstrating its importance to his pupils, who included Castillon, Duparc, Chausson, and others. Duparc, however, was mainly a song-writer, the first of many who enriched the song repertory with sensitive and poetical work. The greatest of them is Fauré, who also did much, independently of Franck, to advance chamber and piano M. So, on a lower level of taste, if not of workmanship, did Lalo and Saint-Saëns. Guilmant, Gigout, and Widor represented the organ school. Before Debussy and Ravel the most important figure in what now took on the aspect of a renaissance of Fr. non-operatic M. was certainly Fauré, though it may perhaps be said to have begun with the slightly older Chabrier, a most original composer though less profoundly gifted. Meanwhile the Franck tradition was continued, but with a noble independence, by Vincent d'Indy, who showed an interest in folksong which had never touched Franck. This also influenced Bourgault-Ducoudray and Charles Bordes, as well as 'regional' composers like Guy-Ropartz, Séverac, and Ladmirault.

As we turn to the 20th cent., we find opera, sometimes verging on the sensational, continued by Reyer, Bruneau, Charpentier, and Leroux; the new instrumental tradition maintained by Maurice Emmanuel, Dukas, and Koehlin, with Roussel and Florent Schmitt coming in a little later; and the organ school upheld by Tournemire and Vierne. A new influence not unlike that of Chabrier came in the strange figure of Satie, but it was Debussy and Ravel who were the outstanding composers of this period, as eminent in their way as Berlioz had been in the first half of the 19th cent. Satie's influence was shown by some at least of the members of the group known as 'Les Six,' only 3 of whom, Honegger, Milhaud, and Poulenc, continued to make an impression. The 20th-cent. scene is not crowded with composers, and none has so far reached outstanding eminence; Messiaen has achieved some notoriety by excursions into strange territory, and a group of young 12-note composers shows that curiosity in new ways and means has remained a characteristic of Fr. creative musicians. See L. de La Laurencie, *Histoire du goût musical en France*, 1905; N. Dufourq, *La Musique française*, 1949; M. Cooper, *French Music*, 1951. See also

composers' names mentioned in this article.

French Oceania includes all the is. of the Pacific which lie E. of 155° W. long. except for a few small Brit. is. The official title is *Établissements Français de l'Océanie*, and they are administered from Papeete (q.v.) as a colony of France. The groups are as follows: Society Is. (q.v.), Rapa, Australs, Marquesas (q.v.), Tuamotu Archipelago, Gambier Is., and Clipperton Is. (q.v.). The colony is administered by a governor, appointed by France, assisted by a deputy to the Fr. Chamber of Deputies, a local Representative Assembly of 20 members, and a delegate to the Fr. National Union. There are 2 municipal councils, also 94 dist. councils composed of Tahitians which function in the different is. The basic laws are those of France.

The earliest truly scientific exploration of the Pacific was that of La Pérouse. Capt. Cook's discoveries having inspired the Fr. Gov. to sponsor the voyage. In 1788 La Pérouse reached Australia but thereafter was lost. The Constituent Assembly sent d'Entrecasteaux to look for him, but without results; after visiting New Caledonia and sev. strings of is. round it, d'Entrecasteaux d. in the course of his expedition. In 1825, during a cruise to Santa-Cruz, Dumont d'Urville learned that La Pérouse had perished there. Encouraged by the results obtained by Dumont d'Urville's voyage, Louis-Philippe decided to support Fr. missions in Oceania which the Bourbon Restoration had created. These bands of fathers were struggling against the London Missionary Society, which had spread over all the ter. Thenceforward Fr. incursions became frequent, their avowed object being the protection of the Catholic missions in the E. Pacific ocean. Thus the Fr. estab. themselves in Tahiti, which Wallis, a Brit. subject, had explored before Bougainville (q.v.), who had preceded La Pérouse. It only became known later that Bougainville had taken possession of Tahiti for France and buried the authenticated deed in the ground. He named the is. La Nouvelle Cythère. It was in Tahiti that the Fr. missionaries were threatened with expulsion by Queen Pomaré, who was encouraged by the energetic Brit. consul, Pritchard. Adm. Dupetit-Thouars obtained the first agreement guaranteeing the safety of the Frenchmen on the is.; in 1843 he had to organise a new expedition to lay the foundations of a new protectorate and, in the end, had to proclaim the deposition of Queen Pomaré.

The chief industries are the production of copra and phosphate. The fertile coast land grows coconuts, bananas, oranges, sugar, vanilla, and many other tropical products. The chief exports in 1954 were as follows: copra, 21,570 tons (value 270,507,000 francs); phosphate, 228,894 tons (value 186,587,000 francs); vanilla, 130 tons (value 120,710,000 francs); and pearl-shell, 872 tons (value 59,571,000 francs). The total value of imports in

1954 was 711,670,000 francs. The area of the whole colony is 1544 sq. m. Pop. of whole colony in 1951: natives, 53,868; Fr., 1424; Chinese, 6855; others, 881. See J. Stern (former Fr. minister of colonies), *The French Colonies Past and Future*, 1944, and the *Pacific Islands Year Book*.

French Revolution, see FRANCE, History.

French River, Ontario, Canada; it empties Lake Nipissing into Lake Huron and enters Georgian Bay after a rapid course of 60 m.

French Somaliland, see SOMALILAND; JIBUTI.

French Sudan, see SUDAN, FRENCH.

French West Africa, see FRENCH GUINEA; DAHOMEY; IVORY COAST; NIGER; SAHARA; SENEGAL; SENEGAMBIA; WADAI.

French West Indies comprise the is. of Martinique, Guadeloupe, Marie-Galante, Les Saintes, Désirade, St Barthélemy, and part of St Martin in the lesser Antilles. Total area 1105 sq. m.; pop. 469,130. See separate articles.

Freon, liquid known chemically as dichlorodifluoromethane (CCl_2F_2) used as a non-inflammable refrigerant. Also the extract of pyrethrum flowers is dissolved in F. and the solution used as a spray for killing insects.

Frequency (f) of alternating current (a.c.), the number of complete cycles per sec. The periodic time, T , is the time taken to complete 1 cycle or wave. If a coil is rotating at constant angular speed ω in the magnetic field between 2 poles, the e.m.f. induced in the coil completes 1 cycle during 1 revolution. Thus $\omega = \frac{2\pi}{T} = 2\pi f$. In power supply the F.

in Europe is usually 50 cycles per sec., in the U.S.A. 60 cycles/s. For traction, 16½ or 25 cycles is common. In radio communication a wide range is used, expressed in kc/s = 1000 c/s or Mc/s = 1000 kc/s = 10^6 c/s. Electromagnetic waves are propagated in space at a velocity of 3×10^{10} cm/s, thus wavelength and F. are related by $\lambda/T = f\lambda = 3 \times 10^{10}$ cm/s. The F.s are classed as:

very low	VLF	<30 kc/s, $\lambda > 10$ km
low	LF	30–300 kc/s, $\lambda = 10 - 1$ km.
medium	MF	300–3000 kc/s, $\lambda = 1000 - 100$ m.
high	HF	3–30 Mc/s, $\lambda = 100 - 10$ m.
very high	VHF	30–300 Mc/s, $\lambda = 10 - 1$ m.
ultra-high	UHF	300–3000 Mc/s, $\lambda = 100 - 10$ cm.
super-high	SHF	3000–30,000 Mc/s, $\lambda = 10 - 1$ cm.

Continental writers use the Hz (Hertz, q.v., after the Ger. physicist) and multiples kHz, MHz, as unit for F., 1 Hz = 1 c/s.

Frequency Modulation, see MODULATION.

Frere, Sir Henry Bartle Edward (1815–84), administrator, b. Clydach, Brecknockshire, and educ. at Bath and Haileybury. He entered the Bombay civil service in

1834, and remained in India for 33 years. During the mutiny he did invaluable work in connection with the relief of the Punjab, for which he was thanked by Parliament, and in 1859 appointed a member of the viceroy's council. Returning to England, 1867, he held various offices, and in 1877 was made governor of Cape Colony and high commissioner of South Africa. Under his rule occurred the first Boer war and the struggle with Cetewayo. In 1880 he was recalled for having exceeded his instructions. He defended himself in *Afghanistan and South Africa*, 1881, and other pubs. See life by Martineau, 1895.

Frere, John Hookham (1769–1846), Eng. diplomatist and author, son of John F., a distinguished antiquary, b. London and educ. at Eton and Caius College, Cambridge. He served in the Foreign Office, and, subsequently entering Parliament, was made under foreign secretary. In 1800 he was envoy to Portugal; ambas. to Spain 1802–4 and again 1808–9. He made some excellent trans. of the plays of Aristophanes, and was one of the founders of *The Quarterly Review*.

Fresco Painting, process of mural P. on plaster which is still *fresh* (lt. *fresco*) or wet. F. P. is executed on a brick or stone wall which must, first of all, be perfectly dry. The plaster to be applied is composed of lime and water prepared a year before it is wanted and then mixed with sand at the time of using. Sev. coatings of this preparation are applied, but the first ones only—the *arriccio*, half an in. thick—to the entire wall at once. The 2 finer coatings—the *intonaco*—are applied only to that portion of the wall which it is intended to paint in the day, so that it may not be dry before receiving the pigments. The reason for this is that in the process of drying, a crystal surface of carbonate of lime forms over the plaster, and it is essential that the pigments should be there ready to receive this coating, for it is protective to them and gives them clearness. When the plasterer has covered the portion of wall to be painted, the painter superimposes his cartoon and pricks off the outlines with an instrument of wood or bone, or makes an impression of it by pouncing. The cartoon is then removed and the colours are applied. The fresh plaster becomes thoroughly impregnated by them, and they are thus incorporated with the rock or stone of lime and sand which constitutes the plaster, and are therefore as enduring as the stone plaster if the process is properly carried out. The colours, which are principally earths or minerals, for these best resist the chemical action of lime, are ground up and mixed with pure water; they should be thin and transparent, and darker than required, for in drying they become paler. From its nature F. P. must be executed rapidly and its effects produced by single touches of the brush: therefore none but a master-hand can exercise the craft with complete success. F. P. has sometimes been confused with the *in tempera* and *encaustic*.

methods of P., which probably preceded it. The date at which it came into use cannot be fixed; it belongs to remote antiquity. Colossal figures painted *afresco* have been taken from ancient Egyptian palaces and temples, and fragments have been recovered in Herculaneum and Pompeii which had lain for centuries beneath masses of earth and ruins. These had preserved all their original brightness of colour. The best exponents of the craft were the It. masters, among them Giotto, Masaccio, Ghirlandajo and Michelangelo, Piero della Francesca and Luini. Ruskin says that F. P. seems to have been practised at Verona in absolute perfection in the 15th cent. In modern times F. P. has languished, though in their attempt to emulate early It. masters it was practised with fair technical success by Cornelius and other 19th-cent. Ger. painters. The attempt to introduce F. P. in London, notably in the ambitious enterprise of decorating the Houses of Parliament by this means, was not successful owing to the large quantities of sulphurous acid gas in the atmosphere. See J. Ward, *Fresco Painting*, 1909; H. Feibusch, *Mural Painting*, 1946; and E. W. Anthony, *Romantic Frescoes*, 1951.

Frescobaldi, Girolamo (1583-1643). It. organist and composer, b. Ferrara. He



GIROLAMO FRESCOBALDI

first gained a reputation as a singer. He was organist of St Peter's, Rome, 1608-28, and again from 1633 to his death. He was an excellent teacher, and numbered J. J. Froberger, the Ger. organist, among his pupils. His compositions included various forms of both instrumental and vocal music. A collection of madrigals was pub. at Antwerp in 1608, but it is his organ music (a large number of *ricercari*, *toccatas*, *cansoni*, etc.) that is especially noteworthy and of historical importance. See monographs by A.

Sostegni, 1929; L. Ronga, 1930; and F. Morel, 1945.

Fresh-water Herring, see **COREGONUS**.

Freshwater, largest par., and a seaside resort of the Isle of Wight, England, 10 m. W. of Newport. F. forms the W. extremity of the is., the greater part of the par. being enclosed by the R. Yar. F. is noted for its interesting caves, and as the residence of Tennyson during the latter years of his life. The par. church dates from the 11th cent. Pop. 4000.

Fresnel, Augustin Jean (1788-1827), Fr. physicist, b. Broglie (Eure). He was an engineer of the Ecole des Ponts et Chaussées, and served in the depts of Vendée, Drôme, and Ille-et-Vilaine, but owing to his espousal of the Bourbon cause, lost his post on Napoleon's escape from Elba. Although he was reinstated he had turned his attention to physics in the interval. In 1819 he was appointed a commissioner of lighthouses, and was the first to construct the compound lenses instead of mirrors. He studied effects which were due to the interference of light-waves, and in particular used a special prism (Fresnel's biprism) to produce interference patterns (Fresnel fringes). His discoveries helped to establish the undulatory theory of light, which had first been advanced by Huyghens. See D. F. G. Arago, H. de Senarmont, and others, *Œuvres complètes de Fresnel*, 1866-70.

Fresnes-sur-Escaut, Fr. tn in the dept of Nord, 5 m. NE. of Valenciennes. It manufs. woollens, glass, and beet-sugar, and there are coal-mines nearby. Pop. 7400.

Fresnillo, tn in the state of Zacatecas, on the main line from El Paso to Mexico City, 7350 ft above sea level, at the foot of the Cerro del Proano, and 33 m. NW. of the city of Zacatecas; there are rich silver mines and some copper, and large amalgam works. Pop. 24,600.

Fresno, city and co. seat of the co. of F., California, U.S.A., in the San Joaquin Valley, and 160 m. SE. of San Francisco. It is a rich farming dist., producing grains and fruit, especially Smyrna figs, and grapes for raisins and wine-making. The chief industries are the preserving of fruits, lumbering, and mining; there are canneries, cotton-seed and olive-oil mills, foundries, and brick and pottery plants; farm equipment and clothing are also manufactured. The F. petroleum field is one of the richest in the state. F. is the seat of F. State College. Pop. 91,670.

Fretum Gallicum, see **DOVER, STRAIT OF**.
Fretum Herculeum, see **GIBRALTAR, STRAIT OF**.

Fretwork, or **Fretsawing**, art of cutting exterior and interior patterns in thin material such as wood, sheet metal, composition boards, plastics, etc. Designs in the last century were for intricate ornamental articles. To-day designs and plans are pub. for F. which are useful for the making of models, toys, etc., and for architectural planning. The prin. tool is a long-armed metal frame with handle for control and guidance. A thin 5-in.

blade with about 20 teeth to the in. is held by a clamp between the arms. Rapid up-and-down motion causes the teeth to bite and cut and turn in a very small space. Holes are made for the tiny sawblade to be threaded through and refixed in the frame in order that interior frets can be undertaken: a special tool called the archimedian drill has a fine bit for the purpose of boring the hole necessary for the insertion of the saw. Fretsaw blades vary in number of teeth and thickness of blade from fine to coarse; metal-cutting blades have a much larger number of teeth. Full-size design patterns provided are pasted to the cutting material, or copied out on it. After cutting is completed the parts are cleaned with glass-paper (emery paper for sheet metal) and put together to make the complete article. F. in wood incorporates designs for pipe racks, wool winders, cigarette delivery boxes, wall plaques, etc. Treadle machines follow the same principle of cutting and leave both hands free to manipulate the work on the cutting table. Heavier and more ambitious work is thus possible. The most modern machine is a bench machine fitted with a fractional h.p. motor, driven from the electricity supply; this is suitable for the amateur, but heavier machines are provided for the commercial user. See W. F. Chambers, *All about Fretwork*, 1948.

Freud, Sigmund (1856-1939), prof. of neurology, Vienna Univ., famous as an exponent of psychoanalysis (q.v.). He was b. Freiburg, Moravia, and educ. in Vienna, and at the Salpêtrière, Paris. His first serious studies moved from law to natural science. Later he worked under Brücke in the univ., Vienna, and in 1884 became assistant physician at the General Hospital. In 1885 F. became associated with Charcot, the Parisian neurologist, who taught that hysteria is of psychical origin and that ideas can produce physical changes, and F. returned to Vienna with his first inspiration to psychoanalysis. In 1893 he pub. with Breuer, *Studien über Hysterie*, outlining the theory that hysterical cases can be successfully treated while under hypnosis by freeing the pathogenic idea from the unconscious mind. He discovered later that the cure was not lasting, and abandoned hypnosis for suggestion. From this point he progressed rapidly with his studies and consequent discoveries in psychoanalysis, and pub. successively *Die Traumdeutung*, 1900, *Psychopathologie des Alltagslebens*, 1904, and *Drei Abhandlungen zur Sexualtheorie*, 1905. *Die Traumdeutung*, the significance of dreams, embodies some of his outstanding discoveries, among them the claim that the interpretation of dreams is an important factor in psychoanalysis, that the recollected parts of dreams are symbols of the activities of the unconscious mind during sleep when the will is ineffective and conscious self-control is suspended. A new trans., *The Interpretation of Dreams*, by J. Strachey, was pub. in 1955. F.'s life work may be broadly summarised as the exploration of

the unconscious mind. He introduced the term 'id' to define the true unconscious—the self-preservative tendencies and the instincts as a whole. The revolutionary nature of his theories in *Psychopathologie des Alltagslebens* aroused great hostility, and on many occasions his statements during lectures to doctors were met with open ridicule. Moreover, public interest was increasing (the Eng. trans. of this work alone ran into ed. after ed.), and when he crystallised his theories in the assertion that nearly all cases of neurosis were due to the repression of sexual desires a storm of criticism burst upon him. He possessed, however, a personality of unusual strength, and proceeded unmoved. He claimed to have made a further discovery in 1898, when he stated that sexual desires begin at birth rather than puberty. Coming at a time when any frank exposition upon sexual problems shocked the public idea of morality, the claim aroused still fiercer attacks. Informed observers, however, found much to interest them in the consequent doctrine that a disturbance in a child's sexual growth explains all cases of mental subnormality, and that under proper direction sexual impulses may be 'sublimated' into forces which can inspire the noblest achievements. Though he took great liberties with philosophy, and was himself a philosopher *malgré lui*, F. always wrote and spoke as a man of science. He did not claim to have invented his remarkable view of mental processes, but averred that he had merely discovered it. His influence has permeated the world to such an extent that it may be discerned to-day in almost every branch of thought, and particularly in education. A *Times* reviewer writes that 'the famous theory of dreams and the various "complexes" resolve themselves, when viewed as Freud meant them to be viewed, into observations of the activities of the "natural man" imprisoned and ignored yet always alive within us. This original sin, if denied, possesses, he believed, the power to "attach" itself to or "associate" itself with other, apparently good and innocent thoughts, lending them, thereby, its own passionate energy. Hence the innumerable "anxieties" and fears ("phobias") of the mentally sick; hence their strange apings of physical disease, their perverted ideas, their unreasoning prejudices. To resurrect this natural man and yoke his powers to fresh and useful enterprises was the life-aim of the physician' (see also PSYCHOANALYSIS). His *Autobiographical Study*, trans. by J. Strachey, was pub. in 1936. In 1903 he founded the Vienna Psychoanalytical Circle, and by 1906 branches were estab. in other countries. In 1908 his influence spread rapidly, and the first International Psychoanalytical Congress was held at Salzburg, Switzerland. In 1909 the International Psychoanalytical Association was formed with the dual object of regulating propaganda and preventing its prostitution by insincere practitioners. Because of the

Nazi occupation of Vienna, F. sought refuge in London in 1938, and d. there the following year. See H. Sachs, *Freud, Master and Friend*, 1945; and E. Ludwig, *Der entzückte Freud*, 1946. A trilogy of F.'s *Life and Works*, by E. Jones, appeared 1953-1957.

Freudenstadt, Ger. tn in the Land of Baden-Württemberg (q.v.), in the Black Forest (q.v.), 42 m. SW. by W. of Stuttgart. It was founded in 1601 by Duke Friedrich of Württemberg as a silver-mining tn. It was badly damaged in the Second World War, but has been rebuilt and is now one of the most up-to-date spas in Germany. It is also a winter sports centre. Pop. 13,000.

Freund, Wilhelm (1806-84), Ger. philologist. He took an important part in the movement for the emancipation of the Prussian Jews, and ed. a magazine, *Zur Judenfrage in Deutschland* (from 1843), which was largely instrumental in the *Judengesetz* of 1847. He pub. *Wanderungen auf plattischem Boden* and trans. of Gk and Lat. books, but his main work is *Wörterbuch der lateinischen Sprache*, 1834-45, which was fundamental to subsequent Lat. dictionaries.

Frevent, Fr. tn in the dept of Pas-de-Calais. It manufs. textiles, and has iron-works. Pop. 3800.

Frey, Norse god of peace and fruitfulness, son of Njordr, god of wealth, brother of Freyja (q.v.), goddess of love. F. was one of the Vanir, the family of peace gods, as opposed to Odin, etc., the war gods of the Teutons. He was especially worshipped at Upsala.

Frey, Friedrich Hermann, see GREIF, MARTIN

Freyberg, Sir Bernard Cyril, 1st Baron, V.C., G.C.M.G., K.C.B., D.S.O. (1890-), soldier, b. London; emigrated with his parents to New Zealand in 1892. Educ. at Wellington College, New Zealand. Took part on Pancho Villa's side in the Mexican Revolution of 1914. Served with the Hood Battalion R.N.D. in the Dardanelles in 1915. Wounded 9 times in the First World War in France, Belgium, and the Near East. V.C., 1916. Became at 27 youngest brigadier in Brit. Army. Also awarded D.S.O. and 2 bars in that war, Major, 1927, lieutenant-colonel, 1929. Commanded 1st Battalion Manchester Regiment, 1929-31; colonel, 1931; assistant quartermaster-general, S. Command, 1931-3; G.S.O. (1) at War Office, 1933-4. Commanded Grenadier Guards and Queen's Royal W. Surrey Regiment. In Second World War he commanded the 2nd New Zealand Expeditionary Force, 1939. Appointed commander-in-chief of the Gk and imperial forces in Crete, May 1941 (see CRETE, BATTLE OF). Governor-general of New Zealand, 1946-52. Raised to the peerage, 1952. Constable of Windsor Castle, 1953.

Freyberg, see FREIBERG.

Freycinet, Charles Louis des Saulces de (1828-1923), Fr. statesman, b. Foix; he entered gov. service as a mining engineer. On the estab. of the Third Rep. in 1870 he

offered his services to Gambetta, and in Oct. became chief of the military Cabinet. It was mainly his power of organisation that enabled Gambetta to raise army after army to oppose the invading Germans. He entered the Senate in 1876 as a follower of Gambetta, but in Dec. 1877 became minister of public works in the Dufaure Cabinet. In 1879 he became president of the council and minister for foreign affairs; and in 1886 he became Premier. In 1888 he became minister of war in the Floquet Cabinet, the first civilian since 1848 to hold that office. In 1890 he was elected to the academy. In 1893 he resigned from the War Office, somewhat under the shadow of the Panama scandals.

Freycinet, Louis Claude de Saulces de (1779-1842), Fr. navigator, b. Montélimart (Drôme). In 1793 he entered the Fr.



High Commissioner for New Zealand
SIR BERNARD FREYBERG, V.C.

Navy; after taking part in sev. engagements against the Brit., he joined in 1800, with his brother, Louis Henri F. (1777-1840), who afterwards rose to the rank of adm., the expedition sent out under Capt. Baudin in the *Naturaliste et Géographie* to explore the S. and SW. coasts of Australia. Much of the ground covered by Flinders was revisited and new names composed by this expedition, which claimed credit for discoveries really made by the Eng. navigator. An inlet on the coast of W. Australia, in 26° S., is called F. Estuary; and a cape near the extreme SW. of the same coast bears the explorer's name. In 1806 he returned to Paris, and

was entrusted by the gov. with the work of preparing maps and plans of the expedition; he also completed the narrative, and the whole work appeared under the title of *Voyage de découvertes aux terres Australes, 1800-04, 1807-16*. He also wrote *Voyage autour du monde, 1817-20, 1824-44*.

Freyja, Norse goddess of love, one of the Vanir; daughter of Njordhr, god of wealth, and sister of Frey(r). Sometimes confused with Frigga, wife of Odin.

Freyr, see FREY.

Freyre, Gilberto de Mello (1900-), Brazilian writer and social anthropologist, b. Recife, Pernambuco, educ. privately and at the Gilreath Amer. College, Recife. Prof. of sociology, State Normal School of Pernambuco. He was prof. of sociology at the univ. of Rio de Janeiro, 1935-8, and has been visiting prof. at sev. univs. in the U.S.A. He served in the Brazilian Parliament, 1946-50, and was Brazilian delegate to the U.N. General Assembly, 1949. His best work, *Casa-Grande e Senzala*, 1933 (trans. by S. Putnam as *The Masters and the Slaves*, 1946), is a brilliant study of the development of Brazilian civilisation and an outstanding contribution to the sociology of Lat. America. It was continued in *Sobrados e Mucambos*, 1936. F. has also written *Nordeste* (Northeast), 1937, *Um Engenheiro Frances no Brasil* (A French Engineer in Brazil), 1940, *Região e Tradição* (Region and Tradition), 1941, *Brazil, an Interpretation*, 1945, and *Sociologia*, 2 vols., 1945.

Freyningen, Otto von, see OTHO OF FREISING.

Freytag, Georg Wilhelm Friedrich (1788-1861), Ger. Arabist; studied under S. de Sacy in Paris. In 1819 he was appointed prof. of oriental languages at Bonn. He pub. *Selecta ex Historia Halebi*, 1819, *Humasae carmina*, 2 vols., 1828-51, *Darstellung der arabischen Verskunst*, 1830, *Arabum proverbialia*, 3 vols. in 4 tomes, 1838-43, and *Einleitung in das Studium der arabischen Sprache*, 1861; but his fame rests chiefly upon his *Lexicon arabicum-latinum*, 4 vols., 1830-7.

Freytag, Gustav (1816-95), Ger. novelist and dramatist, b. Kreuzburg in Silesia. He studied philology at univs. of Breslau and Berlin. In 1839 he settled at Breslau as *Privatdozent* in Ger. language and literature, and devoted prin. attention to writing for the stage. He achieved success with his comedy, *Die Brautfahrt, oder Kunz von der Rosen*, in 1844, and in 1854 attained a prominent position by his comedy, *Die Journalisten*, one of the finest Ger. comedies of the 19th cent. In 1847 he migrated to Berlin, and the next year he took over, with Julian Schmidt, the editorship of *Die Grenzboten*, a weekly jour. which, founded in 1841, now became the leading organ of Ger. and Austrian Liberalism. His literary fame became universal in 1855 by the pub. of his novel *Soll und Haben*. This was trans. into almost every European language, and was undoubtedly the best Ger. novel of its day. The main purpose of the novel was to show that the Ger. middle class was the

soundest element of the nation. But it has a more directly patriotic intention, in the contrast which it draws between the reputed homely virtues of the Teuton, the shiftlessness of the Pole, and the rapacity of the Jew—views which the Germans still hold to this day. As a Silesian, F. has no love for his Slavonic neighbours, and being a native of a prov. which owed everything to Prussia, he was naturally an earnest champion of Prussian hegemony over Germany. In 1864 he pub. another novel, *Die verlorene Handschrift*, in which he endeavoured to do for Ger. univ. life what in *Soll und Haben* he had done for commercial life. The hero is a young Ger. prof., who is so wrapped up in his search for a MS. by Tacitus that he is oblivious of an impending tragedy in his domestic life. This book was, however, not so successful as its predecessor. Between 1859 and 1862 F. pub. in 5 vols. *Bilder aus der deutschen Vergangenheit*, a valuable work on popular lines, illustrating the hist. and manners of Germany. In 1872 he began a work with a similar patriotic purpose, *Die Ahnen*, a series of 6 historical romances, in which he unfolds the hist. of a Ger. family from the earliest times to the middle of the 19th cent. This series comprises the following novels, none of which, however, reaches the level of his earlier works: *Ingo und Ingriden*, 1872, *Das Nest der Zaunkönige*, 1874, *Die Brüder vom deutschen Hause*, 1875, *Marcus König*, 1876, *Die Geschwister*, 1878, and *Aus einer kleinen Stadt*, 1880. Among F.'s other works may be noticed *Die Technik des Dramas*, 1863; an excellent biography of the Baden statesman, Karl Mathy, 1869; an autobiography, *Erinnerungen aus meinem Leben*, 1887; and his *Gesammelte Aufsätze*, chiefly reprinted from *Die Grenzboten* 1877-8. See J. Hoffmann, *Freytag als Politiker, Journalist und Mensch*, 1922; H. Zuchold, *Gustav Freytag*, 1926.

Friar (from Lat. *frater*, brother), Eng. name given to the members of the various mendicant religious orders, the chief of which were the Franciscans or Minors (Grey F.s), the Dominicans or Preachers (Black F.s), the Carmelites (White F.s), and the Austin F.s or Hermits. Besides these there were the Trinity or Red F.s, and the Cuthched or Crossed F.s.

Friar's Balsam, compound tincture of benzoin which is prepared by macerating benzoin with storax, tolu, and aloes in rectified spirit. It is used in the preparation of soaps and washes, as a medicine, and as a protective coating for wounds.

Friars Minor, see FRANCISCANS.

Friaul, see FRIULI.

Fribourg (Ger. *Freiburg*): 1. Canton of Switzerland, situated in the SW. of the country. The surface is hilly, the highest point being 7858 ft, and the chief rivs. are the Broye and the Sarine. The canton is on the Ger.-Fr. linguistic frontier; two-thirds of the inhab. speak Fr., and are almost entirely Rom. Catholic. It is essentially an agric. and pastoral canton, and is famous for its cheese (Gruyère) and cattle. Timber and

peat are also important products, and there are manufs. of straw hats, watches, and chocolate. Pop. 162,500.

2. (Fribourg en Nivonne) Tn on the R. Sarine, about 20 m. SW. of Bern, cap. of the canton of the same name. The riv. is crossed here by 2 great suspension bridges, constructed in 1832 and 1840. F. is the seat of the bishop of Lausanne, and manufs. sewing-machines, agric. instruments, and fertilisers. The prin. buildings are the collegiate church of St Nicholas, with a nave dating back to the

Jews. As last Nazi protector of Bohemia-Moravia (from 1943) he was guilty of further atrocities. He was among those major war criminals tried and executed at Nuremberg, 1946.

Fricke, Peter Racine (1920-), composer, b. London, partly of Fr. descent, with the poet Racine among his ancestors. He studied at the Royal College of Music in London, served in the Second World War, and completed his studies with Mátyás Seiber. His wind quintet gained the Clements prize in 1947 and his first



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FRIBOURG, SWITZERLAND

13th cent., a 15th-cent. bell-tower, 250 ft high, and an organ with about 7900 pipes; the 16th-cent. tn hall; and the International Catholic Univ., founded in 1889. Pop. 31,400.

Frick, Wilhelm (1877-1946), Ger. politician, b. Aisenz; educ. at Munich, Göttingen, and Berlin Univ. He took part in the National Socialist *putsch* in Munich, 1923. He was the first National Socialist to become a minister, being appointed minister of the interior in Thuringia, 1930; Reich minister of the interior in Hitler's Cabinet in 1933; and Prussian minister of the interior, 1934. F. was largely responsible for bringing the Ger. nation under the complete control of the National Socialist party; in large part he was responsible for legislation to suppress the trade unions, the press, and the

symphony the Kussevitsky award in 1949, when the *Prelude, Elegy, and Finale* was given at the Darmstadt Festival. In 1950 his string quartet was heard at the Brussels Festival of the International Society for Contemporary Music, and the viola concerto at the 1952 Edinburgh Festival. Other works of his are a second symphony, a violin concerto, some vocal chamber music, a sonata for violin and piano, and an organ sonata.

Friction, resistance to motion occasioned by the fact that 2 bodies are in contact, or, more correctly, the tangential force that opposes the motion of one body over another. If a book (say) rests on a horizontal table the weight of the book is balanced by an equal and opposite force which the table exerts on the book. Both these forces act along lines normal, i.e.

perpendicular, to the surface of the table, and the force on the book is called the normal reaction. The normal reaction can be increased by placing a load, such as another book, on top of the first. If the book is now pushed gently from one end no motion occurs, and some other force must therefore be acting on the book to prevent its moving. This force is called the force of F , and since it just balances the push applied to the book, and this is parallel to the surface of contact between book and table, the F also must act in a direction tangential to the same surface. If the push applied to the book is slightly increased no motion occurs, so the F must also increase, and to just the extent required to keep the book stationary. When the applied push is steadily increased, however, a value is reached sufficient to cause the book to move, so there is a maximum force that the F can assume. This is called the limiting force of static F , and its value depends upon the normal reaction, as well as upon such factors as the roughness of the surfaces of book and table, and the natures of the materials of which they are composed. The limiting force of static F depends little or not at all upon the areas of the surfaces in contact, but for dry surfaces and within certain limits of loading, varies directly as the normal reaction, so that the ratio limiting force of static F /normal reaction is a constant typical of the materials in contact and their roughnesses: this ratio is called the coefficient of static F . For most dry and fairly smooth surfaces its value lies in the range 0.15 to 0.6.

If the book is kept in steady motion along the table the F opposing motion is called the kinetic F , and its value is found to be somewhat lower than the limiting force of static F . The ratio of kinetic F to normal reaction is also approximately constant, and practically independent both of the area of the surfaces in contact and of the speed of motion, and is called the coefficient of kinetic F . The above facts may be better appreciated if the following simple experiment is performed. A long, uniform rod is balanced on the outstretched forefingers of the experimenter, a greater length of the rod being allowed to overhang at one end than at the other, and the 2 hands are brought closer together until the forefingers are in contact. The explanation of what happens is left to the reader.

More refined experiments than those described show that when one body slides slowly over the surface of another there is often a tendency for motion to occur in a series of short movements with intervals of rest between them, for example, by alternate slipping and sticking. The origin of the force of F is still a matter of debate. It has been suggested that the resistance to motion arises because tiny protuberances of one surface interlock with those of the other, so that slipping can only occur if these projecting parts become sheared off, or if one is lifted over

the other. There is much evidence, however, to show that during sliding the heat generated at small local areas may be sufficient to raise the temp. there to a value sufficient to melt one of the solids, so that the sliding may involve alternate welding of the surfaces together, and disruption of the welded junctions.

When it is necessary to reduce F to a minimum, as in the moving parts of machinery, it is usual to lubricate the surfaces which are to slide over one another. This means that a film of liquid is kept between the solid surfaces, and holds them apart except when they have been left stationary for some time. Since the film of liquid is maintained by the continual dragging of fresh liquid into the required position by the moving solids, the liquid must be one that adheres well to the bearing surfaces. It must also have a suitable viscosity; that is, it must not be so mobile that it is readily forced out from between the solids and yet should not be so highly viscous as to resist the motion more than is necessary. With lubricated surfaces the F is nearly independent of the normal reaction, but varies directly as the area of the sliding surfaces, and increases with increase of the speed of motion. Another way of reducing the effects of F is to replace sliding by rolling, as is done by using wheels on vehicles, or ball or roller bearings in machinery.

Friday (*A. S. frige dag*, day of Freya or Fregge, the goddess-wife of Odin, being a trans. of the Rom. name of this day, *dies veneris*), 6th day of the week, and the Muslim Sabbath.

Frideswide, or Frædeswitha, St (*d. c. 735*), patroness of Oxford, the daughter of the ealdorman Dida. She refused marriage with a Mercian noble, Algar, choosing rather a religious life. She founded, and ruled as abbess, the nunnery of St Mary's on the site of the present city of Oxford. She was canonised in 1481, and her feast is kept on 19th Oct.

Fridjónsson, Guðmundur (1869-1944), Icelandic poet, novelist, and publicist. His themes are predominantly the life and the struggles of the common people. His sympathy for the oppressed or down-trodden is unfailing, while he swings his lash equally over tyranny, hypocrisy, and conceit. The power and the purity of his language are exceptional, in prose and verse alike.

Fridolin, St, sometimes called **Tridolin**, or **Trudelin** (*d. c. 650*), Irish monk and patron of Glarus in Switzerland. He estab. an abbey on Säkingen Is., in the Rhine, and is known as the apostle of the Upper Rhine.

Friedberg: 1. Ger. tn in the *Land of Hessen* (q.v.), 28 m. N.E. of Wiesbaden (q.v.). It was once a free city of the empire. It has a 12th-cent. fortress, a medieval watch-tower, and a Renaissance castle. There are chemical, leather, and foodstuff manufs. Pop. 14,000.

2. Ger. tn in the *Land of Bavaria* (q.v.), 4 m. E. of Augsburg (q.v.). It has an old castle. Pop. 4500.

Friedeburg, Hans von (d. 1945), Ger. adm. or 'admiral-general,' was second in command of the U-boat fleet early in the Second World War. On the promotion of his chief, Adm. Dönitz, to commander-in-chief of the Ger. Navy in Jan. 1943, superseding Adm. Raeder, F. became commander-in-chief of the U-boat fleet. When Dönitz proclaimed the death of Hitler and his own succession as Führer, F. appears to have been again promoted into Dönitz's former position. He emerged as commander-in-chief of the navy in the closing days of the war, and signed at Rheims the instrument of Germany's unconditional surrender in that capacity. Subsequently imprisoned, he committed suicide.

Friedland: 1. See FRYDLANT.

2. (since 1946 Pravdinsk) Tn in E. Prussia, now Kaliningrad Oblast, 28 m. SE. of Kaliningrad. It was the scene of Napoleon's victory over the allied Russians and Prussians in 1807. Pop. (1939) 4500.

Friedrich, Caspar David (1774-1840), Ger. painter, b. Greifswald, Pomerania, studied art at Copenhagen and in Dresden, and became celebrated as a landscape painter. His mysterious and moonlit views represent supremely well the romantic mood of his time and country.

Friedrich Wilhelm Victor Albrecht, see WILLIAM II.

Friedrich Wilhelm Victor August Ernst (1882-1951), see FREDERICK WILLIAM.

Friedrichroda, Ger. tn in the dist. of Erfurt, in the Thuringian Forest, 22 m. WSW. of Erfurt (q.v.). The ducal hunting seat of Reinhardsbrunn incorporates remains of a Benedictine monastery founded in 1085. The tn is a health and sports resort. Pop. 7000.

Friedrichsdorf, Ger. tn in the Land of Hessen (q.v.), on the slopes of the Taunus hills, 22 m. NE. by E. of Wiesbaden (q.v.). It was founded by Huguenot (q.v.) refugees. Pop. 3000.

Friedrichshafen, Ger. tn in the Land of Baden-Württemberg (q.v.), on the NE. shore of Lake Constance (q.v.), 78 m. S. by E. of Stuttgart. Before the Second World War it was famous as the home of the Zeppelins (q.v.) and the Dornier flying boats. The Zeppelin works were erected by public subscription in 1908. In 1924 the LZ126 flew from here to America, where she was transferred to Amer. ownership, in accordance with the treaty of Versailles (q.v.), and renamed the *Los Angeles*. The *Graf Zeppelin* was constructed here in 1928. During the Second World War F. was frequently and heavily bombed by the R.A.F.; one of these bombing attacks was on the largest radio-location factory in Germany. The tn is a bathing and sports resort, and has connections by ferryboat with Romanshorn in Switzerland. Pop. 30,000. See

Friedrichsholst, Ger. vil. in the Land of Schleswig-Holstein (q.v.), in the Sachsenwald, 15 m. E. of Hamburg (q.v.). Bismarck (q.v.) converted an inn in the middle of the forest into a residence, to

which he eventually retired. He is buried in the mausoleum.

Friendly Islands, see TONGA.

Friendly Societies. Despite occasional periods of financial instability through which some of the smaller S. have passed, the social utility accruing from the almost universal institution of F. S. cannot be doubted. The participation in mutual advantages, on as sound an actuarial basis as small contributions will allow, combines the best principles of economy and collectivism, and the recognition of these facts may be said to have induced the State, almost from the earliest days of F. S., to render them assistance, especially by way of relief from taxation or other public burdens, and, ultimately, to recognise their elements of permanent value by adopting them as an integral part of the great scheme of insurance of 1911.

Voluntary associations for such purposes as the maintenance of members in sickness, old age, and poverty have existed even from early in the 17th cent., and it is generally assumed that the genesis of the F. society is to be sought in the burial club, an institution of a quasi-religious character. But the more complex organisations of to-day are by no means referable to any spontaneous creation, and are rather the outcome of a general social development.

Doubtless F. S. may be formed for almost any purpose of a philanthropic or charitable nature, but a more restricted classification of objects is to be gathered from the consolidating Act of 1896, which enumerates the kinds of S. which may be registered as F. S. under the Act. The purposes of such S. as the Act specifically designates F. S. include the relief or maintenance of the members, their husbands, wives, children, or other relatives in sickness or other infirmity and old age; payment of burial expenses; insurances on birth of children; and relief in case of unemployment, shipwreck, or other circumstances of distress; endowment insurance and insurance against fire of tools or implements to any amount not exceeding £15. Other classes of society regulated by the Act are 'benevolent societies' for any benevolent or charitable purpose; 'working-men's clubs' to promote social intercourse, mental and moral improvement, and recreation; and 'specially authorised societies,' or societies whose purposes justify the extension to them by the Treasury of the provisions of the Act. The report of the royal commission of 1870 divided registered F. S. into 13 classes, and gave them a nomenclature which has not found statutory expression. But the div., though only popular, brings out the distinctive characteristics of the various kinds of society. Affiliated S., like the great Manchester Unity of Oddfellows, the Order of Druids (see DRUIDS, ANCIENT ORDER OF), and the Order of Foresters (q.v.), are those consisting of one central body and a number of independent branches variously called lodges, tents, or

divs. Most of the lodges in existence before 1875 are now registered, but a society having a fund under the control of a central body, to which every branch must contribute, may be registered as a single society.

Two other important classes are the 'collecting' and 'dividing' societies. The former were so named from the fact that contributions were paid to collectors who went from house to house. These societies, as above indicated, are dealt with in the consolidating Act, the Collecting Societies and Industrial Assurance Companies Act, 1896. Under this Act members must be supplied with a copy of the rules and a printed policy for a sum not exceeding 1*l.* each. Default in payment of a contribution is not to cause forfeiture or a lapsed policy until continued default for 14 days after written notice to the member of the amount due. Collectors may not be members of the committee or hold any other office in the society or vote at meetings. Dividing S. are those which levy somewhat higher average contributions, and every Christmas-time divide or 'share out' the surplus remaining after payment of sick allowances during the year. The above Act, as amended in 1908, regulates all F.S. Most S. are, of course, approved S. for National Health Insurance purposes.

A F. society must consist of at least 7 members in order to be registered. The advantages of registry are (1) exemption from penalties under any of the provisions of the Unlawful Societies Act, 1744, and Seditious Meetings Act, 1817, so long as the business and meetings do not go outside the registered rules. The result is that a registered society may, but an unregistered society may not, require any unauthorised test or declaration from its members without incurring a penalty; (2) exemption from stamp duties; (3) power to obtain transfers of stock standing in the name of trustees by order of the chief registrar when the trustees are absent, dead, or otherwise incapable of making the transfer; (3) preferential rights over other creditors on the death or bankruptcy of officers of the society; (4) power to admit minors as members from the date of birth; (5) power to make loans to members or subscribe to the funds of any hospital, infirmary, or charitable or provident institution such sum as may be necessary to secure to members of the society or their families the benefits of such hospital or other institution; (6) power to invest in savings banks or with the National Debt Commissioners; (7) reduction of rates on death certificates; (8) officers of the society may be compelled to give security for the rendering of proper accounts and to account for and deliver up the property in their hands; and (9) power to proceed summarily against anyone misappropriating the society's property. Every registered society must have a registered office, appoint trustees, audit its accounts, send ann. returns to the registrar, make a quinquennial valuation of its assets and liabilities, and keep

copies of balance sheets and valuations hung up in a conspicuous place in its registered office. Under a registered society an individual member's rights are better safeguarded than in the case of an unregistered society. He is entitled to inspect the books, have copies of the ann. return, and a copy of the rules on payment of not more than 1*s.* In a registered society the limitation of an individual member's benefits, whether he belong to one or more S., is a gross sum of £300, not including bonuses, or an annuity of £52. Surplus contributions of members, after payment of any assurance money, may be accumulated at interest. A member of a registered F. society (other than a benevolent society or working-men's club) may dispose of any sum not exceeding £100 payable on his death by nominating any person he chooses to whom the money shall be paid at his decease. A registered society may invest its funds in any of the funds in which trustees generally are authorised to invest, or in a savings bank, or the public funds, or in the purchase of land, or in any other non-personal security where expressly authorised by its rules.

A F. society may be dissolved either voluntarily or compulsorily. In the former case, the consent of five-sixths *in value* of the members, including honorary members, and of all in receipt of any relief, annuity, or benefit, is necessary, unless their claims are provided for. In the case of an insolvent society, one-fifth *in number* of the members may apply to the registrar for a compulsory dissolution, and the registrar may make an award to that effect if on investigation that seems the best course.

F. S. were classified under 2 headings by the Industrial Assurance Act of 1923, as Life Assurance S. and Collecting S., and changes were made in the control of these bodies. The most important of these was the appointment of a commissioner of F. S., in whom are vested very great powers of control, and against whose decision it is only possible to appeal to the high court. The commissioner can demand to be satisfied on financial and other subjects, and may return or refuse to pass balance sheets and other accounts, and can dissolve a society that defaults or fails to carry out its legal obligations. He has also the power to exempt bodies from the requirements of the Acts and is the authority to settle disputes, thus taking the place previously held by the Board of Trade. The Acts of 1923 and 1924 slightly varied the existent law on the insurance of children by making the limit for which a child can be insured 25 up to 3 years of age, £10 up to 6 years of age, and £15 up to 10 years of age, but this alteration was in view of the slightly changed purchasing power of money. The old principle was maintained that no child should be insured for a larger sum than the cost of a funeral. In these and subsequent Acts powers were given for insurance in cases where the decease of the insured person might involve a liability on

the insurer. The Acts of 1923, 1924, and 1929 made it an offence to issue illegal life policies. Up till this change, premiums were frequently paid where there was no insurable interest, and thus money was lost to the insurer. In the new Acts it was provided that such a policy, issued in error, was to have a value bearing relation to the amount that had been paid, and this amount could be claimed in cash or as a paid-up policy.

War legislation affecting F. S. and their members' rights included the Industrial Assurance and Friendly Societies (Emergency Protection from Forfeiture) Act, 1940, which applies to any policy of life assurance (where there is a separate contribution) for a sum assured not over £50 (excluding bonuses), in force immediately before 1 Sept. 1939, subject to not less than 2 years' contributions having been paid. This Act prevents the lapsing of such assurances where failure to pay contributions was due to circumstances arising out of the war. The Societies (Miscellaneous Provisions) Act, 1940, enabled the chief registrar to give directions to authorise the suspension of meetings, appointment of officers, and the making or amendment of rules by the management committees of S. The Act also empowered S. to set up a fund for the purchase, on behalf of their members, of national savings certificates, defence bonds, and such other securities as might be presented. Furthermore, the Act gave protection to members serving in the forces whereby they should not be deprived of their membership by reason of their discontinuance of the payment of their contributions whilst serving, and whilst benefit might be suspended until such time as the member resumed his contributions within 3 months of determination of his service (or of the emergency period), upon resuming contributions the member was to be placed in the same position as to future benefits as he would have been had he not ceased to pay his contributions. But the Act did not preclude S. from granting to their serving members better terms than the minimum statutory protection.

There can be no doubt that members of F. S. benefited financially by the first National Insurance Act. It is probable that the new comprehensive National Insurance scheme when in full operation—with its increased contributions to provide the 'cradle to the grave' benefits on a scale beyond any 1912 conception—will have repercussions on the *voluntary* F. S., but only time will show the extent of its effect on the numerical strength and potential income of these S., with their various systems of sickness insurance and combined benefits tables based on a wide range of contributions scaled according to age and the extent and nature of the benefits provided. Since the insurance schemes of 1912 was introduced the voluntary S. have continued to grow in the face of keen competition, but their great expansion has naturally brought many S. to the point where they have already found

it difficult to maintain a sufficient influx of new young entrants to replace membership losses due to death and other causes. As to how far the general body of members comprising the F. S. movement can afford to continue their *voluntary* insurances along with their higher State scheme contributions in future, it must be borne in mind that present-day wage levels are much higher for all classes of workers than in 1912, and the gov. has declared that continued *voluntary* insurance to supplement State benefits, wherever one's means permit, should be encouraged. From 1938 to 1954, however, wages increased by 190 per cent, but the funds of F. S. by only 42 per cent. It is also apparent that until 1954 the deposit F. S. with their emphasis on personal savings were able to attract higher contributions and showed a better financial record, despite falling membership, than those F. S. which stressed the insurance function. In most S. the rules provide for (a) contributions at a uniform rate for all ages, together with an entrance fee varying according to the age of the entrant; or (b) periodical contribution at a rate varying with the age at entry. There are F. S. in many of the Brit. Dominions, notably in Australia, where there is a branch of the Ancient Order of Druids (q.v.). Fraternal S., as they are called, are also common in the U.S.A., but except in Germany and France the system does not prevail to a great extent abroad. *See also* BUILDING SOCIETY; FORESTERS, ANCIENT ORDER OF; NATIONAL INSURANCE ACT, 1946; ODDFELLOWS; RECREATIVES, INDEPENDENT ORDER OF. *See* F. B. Fuller, *The Law Relating to Friendly Societies*, 1926; W. T. Pratt, *Friendly Societies*, 1931.

Friends, Society of, or Quakers, founded by George Fox (q.v.) (1624–91). Throughout his life Fox called on F. to bear themselves toward others in the way that was *most likely* to call forth the response of goodness to goodness; in other words, as he expressed it, they were 'answering that of God in every one,' even, in fact especially, in those who were doing evil. To a remarkable degree F. lived out the truth that they had seen, but their exposition of it often lacked clearness and consistency, inasmuch as they were entangled in the spirit of their time more than they realised. Nevertheless, it was from this central principle that their special 'testimonies' proceeded. The Quaker insistence on the unlawfulness of all war for the Christian is based not only on humanitarian grounds or even on passages of Scripture but on the conviction that more important than individual or national safety is the bringing of the evil mind to the 'inner light.'

Fox's first recorded success in gaining converts was at Manchester in 1647, but the beginning of a Quaker Church was in 1652, when some hundreds of 'Seekers' were 'convinced' by him at Preston Patrick, near Kendal. After 2 years' activity in the N. of England an organised campaign in 1654 carried the message all

over England and Wales. About this time F. meetings began to be held in Scotland and Ireland. The glowing ardour, sometimes injudiciously manifested, of the preachers, and certain mannerisms, drew on them the attacks of the mob, sometimes led by ministers of religion, to whom the Quaker testimony against a paid ministry and the payment of tithes was naturally unpleasing. In 1650 Fox, when imprisoned at Derby on a charge of blasphemy, called upon Justice Bennett to tremble at the word of the Lord. The justice retorted by calling him 'Quaker,' a word that had already been used of a certain fanatic sect, and the name stuck to the newly formed body because of its appropriateness, inasmuch as in some of their meetings a wave of spiritual emotion would cause a trembling to go through the company. After the restoration of the monarchy in 1660 the Conventicle Acts of 1664 and 1670 made illegal religious meetings of more than 4 persons (in addition to members of the family in whose house they met) held otherwise than in accord with the way of the Anglican Church. In many places other nonconformists gave way before the storm, but according to the testimony of their enemies F. held out to the end, often meeting in the street in all weathers when their meeting-house was closed against them, many hundreds of men and women being taken to prison. The refusal to take the oath of allegiance brought down on many F. long terms of imprisonment, their bare promise and their statement that it was against their principles to be concerned in plots not being accepted. About 450 F. *d.* in prison or directly in consequence of imprisonment. It was shortly before 1670, when, by reason of the death or imprisonment of leaders, the cause of Quakerism was at a low ebb, that Wm. Penn (q.v.) and Robert Barclay (q.v.) came to it, and by their worldly standing, their learning, and the depth of their spiritual life they powerfully reinforced it.

The Toleration Act of 1689 gave liberty for Nonconformist worship. For the next 150 years F. settled down into quietism, their 'testimonies' tending to become matters of ritual and tradition rather than of living conviction. Early in the 18th cent. F. opposed the trade in slaves and later, under the leadership of Woolman, Benezet (q.v.), and others they gave freedom to all their slaves. This enabled F. in England to contribute leadership and united support to the movement under Clarkson and Wilberforce for the abolition first of slave trading by Britain (1807) and then of slavery itself in Brit. dominions (1833). They were marked off from the world by peculiarities of dress and speech, and they studiously secluded themselves from it except in so far as they were mixed with it in business and as they answered the calls of philanthropy. Deservedly they gained a reputation for rigid honesty and for right living in general, but also for being almost a monastic sect not desirous of increase.

The walking in the light led to a high standard of truthfulness, so that F. in courts of law and elsewhere refused to confirm their words by oath, inasmuch as an oath lowers the value of ordinary speech. Not only did they quote Matt. v. 33-7 and James v. 12, but they also insisted that for a follower of Christ, the *Truth*, it was a lowering to attempt to confirm his word by something supposed to be more binding. 'People swear to the end they may speak truth; Christ would have them speak truth to the end they might not swear' (Penn). They were confirmed in their stand by seeing all about them the small regard for oaths paid by many who had solemnly taken them. This same principle led Quaker shopkeepers to break away from the custom of bargaining by asking for their goods a higher price than they intended to take. This they held to be insincere, but though their practice led to temporary loss of custom, the convenience of the fixed price was so obvious that it became the usual way of trading.

In 1796 they opened the 'Retreat' at York, the first asylum in England, almost the first in the world, where the insane were treated with humanity and efforts made to cure them. Elizabeth Fry's (q.v.) work for prison reform, begun in the early 19th cent., is well known. The fact that many Quaker conscientious objectors themselves suffered imprisonment in the First and Second World Wars has helped to keep alive the concern of F. for penal reform, and they also work for the abolition of cap. punishment.

A heightened conception of the light of Christ in every man has always rendered F. keenly sensitive to outward conditions which put special difficulty in the way of obedience to it. From their beginning they have taken thought for the poor, having, even early on, some insight into the economic causes of poverty. Over a long period they have followed in the track of wars, organising (from their own people and from outside) measures of relief for civilian sufferers. This was done on a large scale after the Franco-Prussian war of 1870-1, and on a much larger scale during and after the First and Second World Wars. In 1947 the Nobel peace prize was awarded jointly to the Amer. Friends' Service Committee and the Friends' Service Council, in recognition of the S.'s work for international reconciliation.

Soon after the middle of the 19th cent. F. began to mix in the world undistinguished in appearance from others. One result of this emergence was an interest in foreign missions, and the S. of F. are now working in India, Kenya, Madagascar, Syria, and Pemba, and also maintain international centres in Geneva, Paris, London, etc., to promote international understanding. In their own country they have had a keen sense of civic responsibility, and very many of them, in proportion to their numbers, have taken part in the public life of their communities. John Bright and other

F. who entered politics in the 19th cent. were criticised for so doing by some of their fellow members, but that attitude has passed. There are now usually sev. members of Parliament who are Quakers. Excluding themselves for a large part of their hist. from art and music and various forms of literature, they have found recreation in natural hist. and science, and in these branches of knowledge and in medicine the Society has given to England a large number of eminent men. In philanthropic and commercial enterprise many of its members have been pioneers.

From its beginning the Quaker Church has needed an organisation; the present system is substantially the creation of

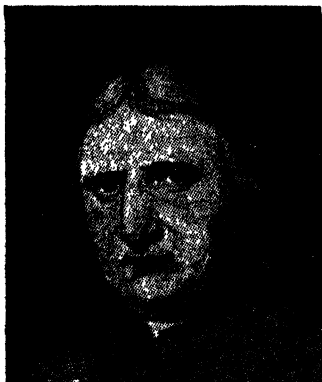
meeting. If on important matters there is considerable difference of opinion a time of quiet waiting or an adjournment almost always leads up to a conclusion which can be assented to by most, if not by all.

The Meetings for Suffering, estab. in 1675 to supply the needs of sufferers from persecution, is a representative assembly, meeting monthly in London. It is the executive body of the Yearly Meeting, and it also takes cognisance of the desire of F. for service in various parts of the world: it is sensitive to the cry of suffering wherever heard, and it watches legislative and other movements which have special bearing on national and international righteousness.

Elders are appointed to care for the ministry, giving advice in the way of restraint or encouragement as it is required. Overseers are appointed to have a special care for the congregation, to know who are in any way in need, who are making inquiries concerning F., and who are needing counsel; they also see to the education of children, etc.

The S. of F. consists (1956) of 21,454 members in Great Britain, and has 436 places of worship. There are, in addition, sev. thousand regular 'attenders' of meetings not in membership. The H.Q. of London Yearly Meeting is Friends House, Euston Road, London, N.W.1, opposite Euston station. The Irish H.Q. is in Eustace Street, Dublin. The total number of Quakers in the world is about 174,000.

The Society of Friends in America.—In 1656 Quakerism was taken to America by 2 women, and others followed, but the colonists, fearing them to be in league with witchcraft and the devil, subjected them to terrible persecution. Three men and a woman were hanged. Before long, however, Quakerism was a dominant influence in Pennsylvania and other colonies both in religious and political life. A period of quietism set in, as in England, and shortly before 1830 Elias Hicks of Long Is. so far pressed the doctrine of the inner light as to result in a self-sufficient individualism independent of the scriptures or other outward aid. He was opposed with unsympathetic rigidity and a secession ('Hicksite') resulted. Those who remained again divided, the extreme conservatives separating from the majority, who were moving toward an undenominational evangelical type of theology. Philadelphia stood apart, its position now being that of Eng. and Irish F. Those from whom the conservatives parted are organised (with the exception of certain Fundamentalist Yearly Meetings) into the 'Five Years Meeting,' B.Q. Richmond, Indiana. With few exceptions (Baltimore and others) they have given up the Quaker way of worship and meet under pastors. They retain the Quaker organisation and (for the most part) the position concerning war and the outward sacraments. The different sections are moving toward a sympathetic understanding of one another, and sev. of



GEORGE FOX

Fox shortly before 1670. In the Preparative Meeting a single congregation deals with its own affairs; sev. Preparative Meetings form a Monthly Meeting, the executive body; among other business it admits members and records withdrawals, it appoints elders and overseers, whose functions will be stated later, it carries through arrangements for marriage in the Quaker way, whether the parties are F. or not; sev. Monthly Meetings form a Quarterly Meeting, concerned with the affairs of F. in one or more cos., and a union of Quarterly Meetings forms a Yearly Meeting, the legislative body for its area. London Yearly Meeting comprises Great Britain; and there are others in Ireland, the U.S.A., India, Kenya, and on the Continent of Europe and elsewhere. Any Friend may attend any of these meetings, and may take part in any of which he or she is a member.

Each meeting is presided over by a man or woman (aided by an assistant) who acts as secretary, and is called the clerk. Decisions are not arrived at by vote, but after discussion (free from noise of applause or dissent) the clerk records what he considers to be the judgment of the

the divided Yearly Meetings have recently reunited. See R. M. Jones, *The Quakers in the American Colonies*, 1911, *The Later Periods of Quakerism*, 1921, and *The Faith and Practice of the Quakers*, 1949, ed.; W. C. Braithwaite, *The Second Period of Quakerism*, 1919, and *The Beginnings of Quakerism*, 1955 ed.; J. W. Graham, *The Faith of a Quaker*, 1920; E. Grubb, *What is Quakerism?* 1949 ed.; A. Raistrick, *Quakers in Science and Industry*, 1950; J. Woolman, *Journal*, reprinted 1952; H. H. Brinton, *Friends for 300 Years*, 1953; A. N. Brayshaw, *The Quakers: their Story and Message*, 1953 ed.; H. Loukes, *Friends Face Reality*, 1954.

Friends of the National Libraries, see LIBRARIES, FRIENDS OF THE NATIONAL.

Friern Barnet, urb. dist. of Middx, England, 8 m. N. of London, including Whetstone and Muswell Hill. Pop. 29,164.

Fries, Elias Magnus (1794-1878), Swedish botanist and taxonomist, b. Småland. Prof. of botany at the univ. of Lund (1824), and later at Upsala (1851), and director of Upsala botanical museum and garden. His *Systema Mycologicum* and the *Flenchus*, 1821-32, became important for the nomenclature of fungi. Other works include *Novitiae florae Suevicæ*, 1822, *Epicrisis systematis mycologici*, 1836-8, *Summa vegetabilium Scandinaviæ*, 1846-9, *Hymenomyces Europæi* and *Icones*, 1874, and monographs on lichens and plants.

Fries, Jakob Friedrich (1773-1843), Ger. philosopher, b. Barby, Saxony. He was prof. of philosophy and elementary mathematics at Heidelberg in 1806, and in 1816 was invited to fill the chair of theoretical philosophy at Jena, but was deprived of his professorship for participation in the democratic disturbances of 1819. He was, however, recalled in 1824 as prof. of mathematics and physics, and while at Jena wrote *Handbuch der praktischen Philosophie*, 1817-32, *Handbuch der psychischen Anthropologie*, 1820-1, *Die mathematische Naturphilosophie*, 1822, *System der Metaphysik*, 1824, and *Die Geschichte der Philosophie*, 1837-40. Besides these he wrote the important treatise, *Die neue oder anthropologische Kritik der Vernunft*, 1807, in which he attempted to give a new foundation of psychological analysis to the critical theory of Kant. He is a link between Kant's system and the so-called historical school. See T. Elsenhans, *Fries und Kant*, 1906, and E. Gaede, *Die Religionsphilosophie von J. F. Fries und A. Görland*, 1935.

Friese-Greene, William Edward (1855-1921), inventor, b. Bristol; educ. at Queen Elizabeth's Hospital School, Bristol. His patronymic was Green; he took the name of Friese-Greene after his marriage in 1874 to Helena Friese. At the age of 15 he was apprenticed to a Bristol photographer, but after his marriage he set up a studio of his own in Bath. In 1880 he became associated with J. A. R. Rudge, the inventor of a form of magic lantern called the bio-phantoscope. With

Rudge he built a primitive projector for showing 12 photographs on glass plates in quick succession. With this F.-G. gave the first demonstration of cinematography in England. This was at a meeting of the Photographic Society in 1885. He realised the need for using some other substance than glass, and after a number of experiments with sensitised paper he was one of the first to appreciate the advantages of celluloid film. In 1889 he was granted a patent for a camera made 'to produce a series of instantaneous photographs of moving bodies which may afterwards be combined to produce animated pictures.' This camera had many resemblances to the modern ciné-camera, but was not put into practical use. F.-G. was compelled to sell the patent, and with the subsequent growth of the cinema industry his pioneer efforts were largely forgotten. He was also a pioneer with his experiments in colour photography, and was a profound believer in the possibilities of stereoscopic photography. A long list of patents stands to the credit of his inventive genius. He gained little financial recognition, however, and his costly experiments were paid for out of the proceeds of his work in studio photography in London, and later in Brighton. He was in very straitened circumstances at the time of his death, which occurred suddenly from heart failure during a meeting of film exhibitors. See R. Allister, *Friese-Greene: Close-up of an Inventor*, 1948.

Friesland, or Vriesland, prov. of the Netherlands, on the N.E. side of the IJsselmeer (Zuider Zee). The surface is flat, and the coasts are protected by dikes, much of the prov. being below sea-level. There are sev. lakes, and the prov. has an extensive canal-system. The chief industries are cattle-rearing and the making of cheese and butter, but on the clay lands agriculture is also extensively practised. Woollens, fine linen fabrics, and sail-cloth are manufactured, and peat is dug in the higher fen dist. The prin. towns are Leeuwarden (cap.), Sneek, Harlingen, Bolsward, and Heerenveen. Area 1291 sq. m.; pop. (1954) 470,227. See also FRIANS.

Friesland, East (Ger. *Ostfriesland*), name given to a region in NW. Germany, on the North Sea, between Jade Bay and the estuary of the Ems. It includes the E. Frisian Is. It was once part of Friesland (q.v.). It became a co. in the 15th cent., and later a duchy. In 1744 it passed to Prussia, and in 1815 to Hanover. Its cap. was Aurich (q.v.). Area about 1000 sq. m.

Frieze, in classical architecture, the member of the entablature above the architrave and below the cornice. It is decorated in various ways according to the Order used (see ORDERS OF ARCHITECTURE). In domestic architecture the name F. is given to the band of decoration which runs round the interior walls of a building immediately below the cornice, and above the picture-rail, if any.

Frigate, originally an oared sailing ship of the Mediterranean. Many such ships were built for the Brit. Navy in the 17th

cent.; but it was only during the Seven Years War that the first ship of the type technically known as a F. was built—a fast, full-rigged ship with upper deck, spar deck, and lower deck, carrying guns which by 1808 had increased in number to 50. The term is now used to describe certain types of anti-submarine vessels in the Royal Navy. One of them, H.M.S. *Maggie*, was formerly commanded by H.R.H. the Duke of Edinburgh. A large number of F.s have been built for the R.N. since the war and form a most important addition to the Fleet. Their armament includes the latest anti-submarine weapons, which represent a great advance on the depth-charge thrower. Some new F.s are equipped for anti-aircraft and aircraft direction duties. *See* Sloop.

Frigate Bird, or Man-of-War Bird (q.v.), marine bird belonging to the family *Fregatidae* of the order *Pelecaniformes*, and a native of the tropics. Its colour is black, strongly tinged with brown, while the pouch is scarlet. It is a large bird, having a long tail and wings, and a long hooked beak. It is essentially a sea-bird, and only comes to land during the breeding season. Its chief food is fish, and it has a habit of seizing the prey which it has forced another bird to disgorge. The 2 species of this family *Fregatidae* are *Fregatus aquila* and *F. minor*.

Frigga, or Frigg, Norse goddess, wife of Odin, and mother of Balder (q.v.). *See* also ASSES; BRAGI; HELMDALLR.

Fried Lizard, *see* CHLAMYDOSAUROS KINGI.

Frimaire (frosty month), 3rd month of the year in the Fr. revolutionary calendar. *See* CALENDAR.

Frimley, tn in Surrey, England, 30 m. SW. of London. It now forms an urb. dist. with Camberley. It is mainly residential. Pop. (with Camberley), 24,220.

Fringillidae, *see* FINCH.

Frinton-on-Sea, seaside resort in Essex, England, 7 m. NE. of Clacton. A favourite centre for tennis tournaments. Pop. (with Walton-on-the-Naze) 9900.

Frisches Haff (Polish *Mierzeja Wiślana*; the *Vistula Lagoon*), lagoon of the Baltic Sea, SE. of the Gulf of Danzig. Its name means 'freshwater bay.' It was formerly in E. Prussia, and is now divided between Poland and the U.S.S.R. Once it was separated from the Baltic by a narrow spit of land, the *Frische Nehrung*, but in a storm in 1510 a passage was cut through this. It is about 50 m. long, 332 sq. m. in area, and 10-16 ft deep. In 1945, during the Russian invasion of E. Prussia, there was protracted fighting in the area of the F. H., Königsberg (Kaliningrad) being the objective. On 26 Jan. Soviet troops reached the Gulf of Danzig, and thereby cut off the E. Prussian garrison from central Germany. Elbing (Elbląg) was taken on 10 Feb., Braunsberg (Braniewo) fell after a severe struggle, but Pillau (Baltiysk) long held out, and Königsberg surrendered only on 9 April.

Frisi, Paolo (1728-84), It. mathematician, was a native of Milan. At the age of 16 he entered the Barnabite order,

and in 1756 was appointed prof. of mathematics at Padua. In 1764 he received a similar appointment in Milan, and just after this time visited sev. of the countries of Europe. Among his works are *Disquisitio mathematica*, 1751, *De Causa electricitatis dissertatio*, 1757, and *Cosmographia physica et mathematica*, 1774, 1775.

Frisian Islands, long chain of is. situated in the North Sea and extending along the coasts of the Netherlands, NW. Germany, and SW. Denmark. They are separated from the mainland by shallow flats (*wadden*), and are divided into the West F., East F., and North F. I. Originally part of the coastline, the is. were formed by penetration of the sea, and floods have diminished the area of most of them. Sheep and cattle are raised, and there are a number of small seaside resorts.

Frisians, seafaring people of Teutonic stock, who in the 1st cent. of the Christian era inhabited the coast lands between the mouths of the Scheldt and the Ems. They were partly conquered by the Rom. gen. Drusus, but revolted in AD 26. They were, however, again subdued by Corbulo in 47, but shortly afterwards all Rom. troops were withdrawn to the l. b. of the Rhine. In 58 they made an unsuccessful attempt to secure lands between the Rhine and the Yssel, and in 70 took part in the campaign of Claudius Civilis. It is uncertain whether they took part in the conquest of Britain, but they came into prominence again in the 7th cent. with the rise to power of the Franks. These people attempted to Christianise the F., but met with small success until Wilfred of York went there to convert them. The struggle between the Franks and the F. lasted for about 200 years, and although the F. made a stand for their freedom, they were compelled to cede the dist. from the Scheldt to the Zuider Zee to Pépin le Gros after an unsuccessful battle at Dorstadt in 689, and in 736 to acknowledge the supremacy of the Franks in the N., being finally subdued in 785 in the days of Charles the Great. Philip the Good of Burgundy laid claim to the whole of Friesland, but the people called on Frederick III in 1457 to protect their rights, and were acknowledged as dependents of the empire; but in 1498 Maximilian, Frederick's son, detached the prov. of Friesland from the empire and gave it as a fief to Albert of Saxony, and in 1523 it fell with the rest of the provs. of the Netherlands under the rule of the Emperor Charles. From 1579 to 1795 it was one of the constituent parts of the rep. of the United Provs., preserved its own dialect, and had a separate stadtholder; but in 1747 William IV was made hereditary stadtholder of all the provs., and his grandson, in 1815, took the title of King of the Netherlands.

Language.—W. Frisian is spoken by about 320,000 people in the Dutch prov. of Friesland, and on the is. of Terschelling and Schiermonnikoog; E. Frisian in Hanover prov. and the outlying is. of

Oldenburg is dying out; and N. Frisian, spoken by about 15,000 people on Föhr, Sylt, and the coast between Tondern and Husum. But the language is being supplanted more and more by Dutch. *Plattdeutsch* in Germany, and Dan. See J. Jung-Diefenbach, *Die Friesenbekehrung*, 1931.

Frith, or Fryth, John (1503-33), Protestant, b. Westerham, Kent, and educ. at Eton and Cambridge. Being invited by Wolsey he went to Oxford, but on account of his zealous support of reformation principles he was imprisoned. He was, however, released, and he then retired to Marburg, where he collaborated with Tyndale in his literary work. On his return to England in 1532 he was condemned to death for heresy, and burnt at Smithfield. He wrote, among other works, *Disputation of Purgatorie*, 1531.

Frith, William Powell (1819-1909), artist, b. Aldfield, Yorks, studied in the Academy schools and was elected R.A., 1852. His first attempts were costume pieces such as 'Othello and Desdemona' and 'Coming of Age in the Olden Time.' After 1853, however, he turned to realistic scenes of Eng. life. The grouping in these pictures shows great dexterity, and the types of people that he depicted testify to his observation and sense of humour. Among the best of these works are 'Derby Day' (National Gallery), 'Ramsgate Sands,' and 'The Railway Station.' His *Reminiscences* were pub. 1887-8.

Frith, see FIRTH.

Fritillaria, genus of bulbous plants of N. temperate regions, family Liliaceae, over 80 species; *F. imperialis*, the crown imperial, *F. meleagris*, the snake's head, and others are popular garden flowers.

Friuli (Ger. *Friaul*; anc. *Forum Julii*), former Lombard duchy at the head of the Adriatic. Until 1919 it was divided between Italy (Udine, Portogruaro, qq.v.) and Austria (Gorizia, Gradisca, Idrija, qq.v.). By the treaty of St Germain-en-Laye (q.v.) it became wholly Italian. After the Second World War a small portion was ceded to Yugoslavia. See **FRIULI-VENEZIA GIULIA**.

Friuli-Venezia Giulia, region (*compartimento*) of NE. Italy, comprising the provs. of Udine and Gorizia (qq.v.). It is bounded on the N. by Austria, on the W. and SW. by Veneto, S. by the Gulf of Venice, and E. by Yugoslavia (qq.v.). The region has a local autonomy, and was formed in 1947 from W. Friuli (q.v.) and the remaining portion of Venezia Giulia e Zara (q.v.). The chief town is Udine. Area 2945 sq. m.; pop. 937,000.

Froben, or Frobenius, Johannes (c. 1460-1527), Ger. printer, b. Hammelburg in Bavaria. He was educ. at the univ. of Basel, and in 1491 founded a printing office in that city and issued about 300 works, among which may be mentioned his *Neues Testament* in Greek, 1516, which was used by Luther for his trans., and his eds. of St Jerome, St Cyprian, Tertullian, St Ambrose, and Erasmus. Some of his texts are illustrated by Hans

Holbein. It was largely owing to F. that Basel was the leading centre of the Ger. book trade in the 16th cent. After F.'s death his printing business was carried on by his sons and grandsons until 1603.

Frobenius, Leo (1873-1938), Ger. ethnologist, b. Berlin. Studied at Basel. Led 10 scientific expeditions to Africa and Asia Minor between 1904 and 1932. He founded the Institute of Culture Morphology at Frankfurt-on-Main in 1925. From this unique foundation, devoted exclusively to Africa and Oceania, Graebner and Wilhelm Schmidt were to found new schools of comparative anthropology in Vienna and elsewhere. The fact that W. African art and culture became at all known and admired in Europe was due largely to his enthusiasm.

Froberger, Johann Jacob (1616-67), Ger. organist and composer, b. Stuttgart, studied under his father, who became cantor at Halle c. 1620. F. became court organist in Vienna before 1637 until 1657, with a break in 1637-41, when he studied under Frescobaldi in Rome. In 1662 he visited London, but was so poor that he became organ-blower at Westminster Abbey, where he was ill-treated by Christopher Gibbons, but learnt how to play the organ from a foreign lady who presented him to the king, according to a not very well authenticated tradition. He went to Rome again but spent the end of his life at Hércourt, near Montbéliard, where the dowager duchess of Württemberg gave him asylum in her house. F. wrote exclusively for the organ and the harpsichord, so far as his preserved music shows.

Frobisher, Sir Martin (c. 1535-94), navigator, b. in Yorks. He made his first voyage to Guinea in 1554, and in the following 10 years went on yearly expeditions to the N. shores of Africa and the Levant. In 1576 he made his first voyage in search of a NW. passage under the auspices of Ambrose Dudley, earl of Warwick, reaching Frobisher Bay; and in the following year, as adm. of the company of Cathay, he sailed to the same region in search of gold, and explored S. of Meta Incognita and Jackman's Sound, bringing home 200 tons of gold from Kodlun-arn. In 1578 he made his third voyage, and discovered a new strait and the upper part of Frobisher Bay, and in 1586 was vice-adm. in Drake's expedition to the West Indies. He was in command of the *Triumph* fighting against the Sp. Armada, and led one of the 4 newly formed squadrons, and the same year was knighted and put in command of a squadron of 6 ships to sweep the Narrow Seas. In 1590 he was vice-adm. to Sir John Hawkins, and in 1592 captured a large Biscayan ship with a valuable cargo of iron, etc. In 1594 he took part in the expedition for the relief of Brest and Crozon, and received a wound from which he afterwards d. at Plymouth. See F. Jones, *Life of Frobisher*, 1878, and P. F. Alexander (ed.), *The North-West and North-East Passages, 1576-1611*, 1915.

Fröding, Gustav (1860-1911), Swedish poet; b. Alster, Värmland. Although influenced by Byron and Heine, his poetry is intensely individual, combining a sombre *Weltschmerz* with burlesque humour and charming pictures of his native Värmland. Already his first vol. of verse, *Guitarr och dragharmonika*, 1891, had gained great popularity; his later publs., *Nya dikter*, 1894, *Stänk och flikar*, 1896, reveal the same rhythmic skill and technical virtuosity. F. is considered one of Sweden's greatest lyrical poets, and his influence on later writers has been immense. He ended his life in a mental home. See J. Landquist, *G. Fröding*, 1927; H. Olsson, *Fröding ett dikter-porträtt*, 1950.

Froebel, Friedrich Wilhelm August (1782-1852), Ger. educational reformer, b. Oberweissbach. The neglect he experienced in his youth led to his anxiety to promote the happiness of children. His mother d. in his infancy, and F. was apprenticed to a forester. In this position, in the Thuringian forest, he applied himself to the study of nature. No training could have been better suited to strengthen his inborn tendency to mysticism. Unity of nature was the conception in him which dominated all others. With difficulty he got to the univ. of Jena, but his allowance was too small to support him, and his univ. career ended in an imprisonment of 9 weeks for a debt of 30s. In 1802, when he was 20, his father d., and during the next few years he took up land-surveying, acted as accountant and private secretary, but all the time was conscious that he was meant to benefit humanity in some way, how he did not know. Whilst he was studying architecture in Frankfurt-on-Main the director of a model school, who had caught some of Pestalozzi's enthusiasm, persuaded him to take a post in his school. Later he retired from this post and educ. 3 lads in one family. He obtained the consent of the parents to his taking the boys to Yverdon, near Neuchâtel, and there formed with them a part of the celebrated institution of Pestalozzi. For 2 years he was qualifying to carry on the work begun by Pestalozzi. Taking the results at which he had arrived through the necessities of his position, F. developed the ideas involved in them, not by further experience but by deduction from the nature of man, and thus he attained to the conception of true human development and to the requirements of true education. F. now determined to continue the univ. course interrupted 11 years before, but again he was stopped, this time by the king of Prussia's celebrated call to 'my people,' so he enlisted in Lützow's corps and went through the 1813 campaign. Through his patriotism he met Langelthal and Middendorff. These 2 young men became attached to him on the field, and were ever after his faithful followers. Later he opened a school, starting with his own orphaned nieces and nephews as pupils. An educational institution was started by F. in

Switzerland, but it proved a failure. The Swiss Gov., wishing to turn his presence to advantage, sent young teachers to him for instruction. He felt that till the school age was reached, children were neglected, and he devised for small children a graduated course of exercises, modelled on the games in which he found them most interested. At Kellnau he opened the first kindergarten, in the nearby vil. of Blankenberg. This was in 1837. Self-activity was the keynote. The children were taught to do things; it was play, but as they played they learnt. F. wrote his *magnum opus*, *Die Menschen-erziehung* (The Education of Man), in 1826. He believed that 'all education not founded on religion is unproductive.' Pestalozzi taught the development of faculties through exercise, but F. postulated the function of education as the superintendence of inborn faculties by self- or voluntary activity. He held, with Comenius, that the knowledge of nature is the indispensable means of education; with Rousseau that each age has an organic and psychic completeness, but he added importance to the earlier stages. It was natural for him to devote himself, as did Pestalozzi, to the instruction of mothers. While Pestalozzi maintained that the child belonged to the family and Fichte declared categorically that he belonged to society, F. claimed that he belonged to both; he therefore instituted the kindergarten, in which educative play has a great part. See *Autobiography of Friedrich Froebel*, trans. by E. Michaelis and H. K. Moore, 1896; Emily Shirreff, *The Kindergarten*, 1876; *Friedrich Froebel and English Education*, 1952, various authors, ed. by Evelyn M. Lawrence.

Frog-hopper, Frog-spit, see CUCKOO-SPIT.

Frogbit, water-plant of the genus *Hydrocharis* (*H. morsus-ranae*), of the family Hydrocharitaceae. It is monocotyledonous and the leaves are ribbon-like. It is common in ponds locally in Britain.

Frognore, royal residence in the Home Park, Windsor, about 1 m. SE. of the castle. The estate has long been the property of the Crown; the central block of the house dates from the early 18th cent., but there have been many later alterations and additions. F. has 2 mausoleums, that of the duchess of Kent, mother of Queen Victoria, who lived here for 21 years, and the Royal Mausoleum. The foundation stone of the latter was laid by Queen Victoria in 1852; the body of the Prince Consort was moved from the royal vault at St George's Chapel, Windsor, and placed in the mausoleum before its completion. Queen Victoria's body was brought here from Osborne House, Isle of Wight, where she d. Various members of the royal family are buried in the small cemetery adjoining the mausoleum.

Frogs, name applied to the family Ranidae of the order Anura, but in common speech the term is loosely used

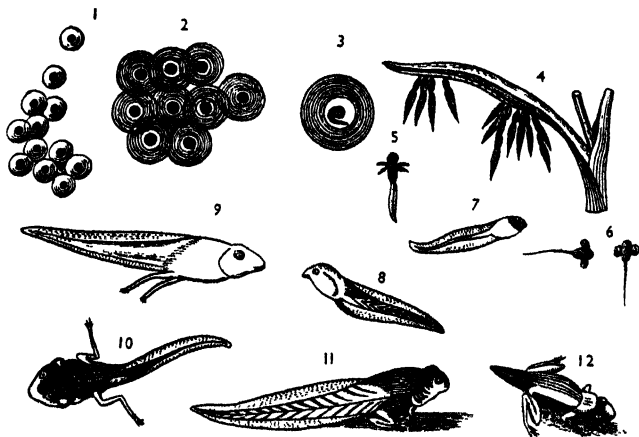
to include other families of the order Anura. The family Ranidae includes some 200 species. The characteristics of the family are the presence of cylindrical



FLYING FROG

transverse processes on the sacral vertebrae, of teeth in the upper jaw, and the vomer, the fixation of the tongue in front instead of behind, more or less marked webbing between the toes, and a horizontal pupil in the eye. The best-known

varieties of F. are the common F. or *Rana temporaria*, the edible F., or *R. esculenta*, and the Amer. bull-F. or *R. catesbeiana*. There are also many very remarkable members of the family. For instance in West Africa there is found a hairy frog, the *Trichobatrachus robustus*, on whose sides and hind limbs long villous outgrowths are seen. Most of the tree-F. are now known to be more nearly allied to toads than to F., but the *Rhacophorus* of E. Asia, called by Wallace the flying frog, is a true member of the family Ranidae. It has markedly developed webs between the toes which it uses as parachutes in jumping from branch to branch. Some tree-F. make nests in the branches of trees which overhang water. The Common F. hibernate in holes in the ground. In the early spring they come above ground and mate. At this season a horny cushion appears on the first finger of the male frog. The eggs are laid in water, and are fertilised as they are laid. Nearly all F. desert their eggs, though there is one species in which the male places the eggs into hollows on the female's back, where they stay until they hatch out. The tadpoles hatch out from the eggs in about a fortnight. At first they are fish-like animals with external gills, and a long swimming tail, but no limbs. The first change to take place is the disappearance of the external gills, and the development of internal gills, which are still later supplanted by lungs. The hind legs appear before the front legs, and the last change to occur is the



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DIAGRAM OF LIFE HISTORY OF A FROG, AFTER BREHM

1-3, developing ova; 4, newly hatched forms clinging to water-weed; 5, 6, stages with external gills; 7-10, tadpoles during emergence of limbs; 11, tadpole with both pairs of limbs apparent; 12, metamorphosis to frog.

diminution and final disappearance of the tail. The tadpole stage lasts about 3 or 4 months. At the end of this time the animal leaves the water and lives in grass. Some species such as the edible frog are always aquatic. The grass frog lives mainly on insects, small worms, etc., which it catches very cleverly with its tongue. By autumn the frog grows big and sluggish. It stores fat in a special gland in the abdomen, and this fat is what it lives on during its winter sleep.

See G. A. Boulenger, *The tailless batrachians of Europe*, 1896; M. C. Dickerson, *The Frog book*, 1906; S. J. Holmes, *The biology of the frog*, 1906; A. H. Wright and A. A. Wright, *Handbook of frogs and toads of the United States and Canada*, 1949.

Frohschammer, Jakob (1821-93), Ger. theologian and philosopher. Ordained priest in 1847. In 1850 and 1854 respectively he pub. *Beiträge zur Kirchengeschichte und Über den Ursprung der menschlichen Seelen*, both of which were placed on the Index. In 1855 he became prof. of philosophy at Munich, and continued to pour forth a stream of false doctrine. This led to his excommunication in 1871, and between 1873 and 1876 he pub. a number of attacks on the Rom. primacy. F.'s later years were spent in philosophical speculation. Among his works in this field is *Die Phantasie als Grundprinzip des Weltprozesses*, 1877. His system is based on the unifying principle of imagination, which he extends to the objective creative force of nature, as well as to the subjective mental phenomena to which the term is usually confined. See A. Hinrichsen, *Deutsche Denker*, 1888; J. Friedrich, *J. Frohschammer*, 1896.

Frössart, Jean (c. 1338-c. 1406), Fr. chronicler, b. Valenciennes. His father was a heraldic painter. Philippa, wife of Edward III of England, made him her secretary in 1361. After her death he was patronised by the count of Namur, the duke of Brabant, and Guy de Blois, seigneur of Chimay, who gave him the living of Lestines. He travelled widely, visiting the courts of England, Scotland, and N. Italy, and that of Gaston de Foix.

F. wrote poetry of an indifferent character, but his fame rests on his 4-volumed *Chronicles*, probably started about 1360, which are a hist. of W. Europe from 1325 to 1400, and form one of the most important original sources of the period, in spite of errors of chronology and topography and certain personal prejudices. Their greatest value lies in their vivid descriptions of the customs and personalities that F. himself knew. See life by F. S. Shears, 1930, and the trans. of the *Chronicles* in Everyman's Library.

Frombork, see ERMELAND.

Frome, mkt tn in Somersetshire, England, 107 m. from London and 24½ m. from Bristol. It contains a 14th-cent. church, a market, and a school of art. There are breweries, foundries, wire-card manufactories and edge-tool works. The

woollen trade is one of the prin. industries. Pop. 11,140.

Fromentin, Eugène (1820-76), Fr. painter and writer, b. La Rochelle, son of a well-to-do physician. He early revealed a dual gift for writing and for painting, and produced (1841) a long poem *Sur la peinture moderne*. He studied under Louis Cabat, the landscape painter. He was much influenced in style by Eugène Delacroix and preferred exotic subjects, being known as the 'African' master (he travelled extensively in North Africa during the 1840's). He gradually turned from painting to literature and had success with 2 illustrated travel books—*Un Été dans le Sahara* 1857, and *Une Année dans le Sahel*, 1859, which won the praise and friendship of Sainte-Beuve and George Sand. His fame was enhanced later by his books *Maitres d'autrefois*, 1876, an exposition of Dutch and Flem. painting, trans. as *Masters of Past Time*, 1913, and *Dominique*, 1863, and it is in them that his name has survived. See lives by L. Gonse, 1881; P. Dorbec, 1926; G. Assolant, 1931; M. Revon, 1937.

Fronde (1648-53), name given to a civil war in France. It is also sometimes applied to the Franco-Sp. war, 1653-9, which was the result of Sp. intervention in the second phase of the F. proper. The word means 'a sling,' and it was used to describe this contest because the windows of Mazarin's followers were pelted with stones by the mob in Paris. Originally the object was the redress of grievances, but there was a factional contest between certain nobles and Mazarin, the former attempting to reverse the results of Richelieu's work and to overthrow Mazarin, his successor. In May 1648 a tax levied on judicial officers of the Parlement de Paris was met by that body not merely with a refusal to pay but also with a condemnation of earlier financial edicts, and even with a demand for the acceptance of a scheme of constitutional reforms, framed by a committee of the Parlement. Helped by Condé, Mazarin was able to force the Parlement to sign the peace of Ruell, 1649. Subsequently Condé turned against Mazarin, enlisted Sp. help, and occupied Paris (1652). By 1653, however, the last strongholds of the F. had been crushed, and the result was, in the long run, a strengthening of the power of the Crown and a corresponding weakening of the power of the nobility and of the Parlement. See P. R. Doolin, *The Fronde*, 1935.

Frontenac, Louis de Buade, Comte de (1620-98), Fr. colonial officer, descendant of an anct Fr. family. He entered the army in 1635 and soon rose to be brigadier. After a brilliant army career he was appointed governor of the Fr. possessions in North America in 1672. His restless activity was a source of strength and vitality to the colony, but it led him into difficulties with the other colonial authorities and with the home gov. His first quarrel was with Perrot, governor of

Montreal, whom he caused to be put into prison. Then came a prolonged and acrimonious dispute with the Intendant Duchesneau, each accusing the other of making illegal gains out of the fur trade. The king, becoming impatient at such continual discord, at length recalled both. During this, his first term of office, F. built Fort F. (now Kingston, Ontario) to control the Iroquois, whom he treated with mingled kindness and firmness. After Denonville, the 11th governor-gen., had been recalled in 1689, the Fr. king turned to F., who, in spite of his 70 years, once again assumed the burden of office. He returned to find that Denonville had ordered Fort F. to be destroyed and that the Iroquois tribes were imperilling the countryside. F. then planned an attack upon the New Englanders. The Eng. colonists, knowing that the Iroquois, their allies, were attacking Canada from the W., replied by attacking the E. settlements of New France by sea. But the preparations which the New Englanders had made for an attack on Montreal, with the help of the Iroquois, proved as great a failure as their attack on Quebec. In his second term F. so broke the power of the Iroquois that they were never again a terror to the colony. F. was the strongest ruler Canada had seen since the death of Champlain. See life by F. Parkmann, 1918.

Frontier College, Canada, organisation by which young men of good education spend some part of the summer in the N. lands, doing manual work, and giving educational instruction. The scheme was begun in 1899 for E. Canada, and was extended to the W. provs. 9 years later. The instructors are univ. graduates, students, or teachers, and their pupils are lumberjacks, miners, and navvies, with occasional settlers. During the past 50 years about 500,000 have received elementary education and taken part in discussion on public affairs. Canadian hist., etc.; in addition, many foreign-born workers have been taught the Eng. language.

Frontinus, Sextus Julius (c. AD 40-c. 106), Rom. writer and soldier, was praetor in AD 70. He was governor of Britain from 74 to 78, and while holding that office distinguished himself by the conquest of the Silures. In 97 he was nominated *curator aquarum*, and d. about 106. He wrote *Strategematon libri iv*, a book on the art of war, and *De aquaeductibus urbis Romae libri ii*, which contains a hist. and description of the water-supply of Rome, and other matters of importance in the hist. of architecture. Both works have survived.

Fronto, Marcus Cornelius (c. AD 100-c. 166), Rom. historian, b. in Numidia. He came to Rome in the reign of Hadrian, made his name as an orator, and was appointed tutor to Marcus Aurelius and Lucius Verus. Few only of his works are extant, and these fall far short of the writer's great reputation. A number of his letters, addressed chiefly to Antoninus

Pius, Marcus Aurelius, and Lucius Verus, were pub. at Rome in 1823. There is also an ed. with trans. by C. R. Haines (Loeb Library, 2 vols., 1919-20). See M. D. Brock, *Studies in Fronto and his Age*, 1911.

Frosinone: 1. Prov. of Italy, in SE. Lazio (q.v.). It is generally mountainous and contains some high ridges of the Central Apennines (q.v.), but is crossed NW.-SE. by the broad valley of the Liri (see GARIGLIANO) and its trib. the Sacco. The prin. tns include F., Anagni, Sora, and Arpino (qq.v.). Area 1278 sq. m.; pop. 479,000.

2. (anc. **Frusino**) It. tn, cap. of the prov. of F., situated on a hill, 46 m. ESE. of Rome (q.v.). It has a trade in agric. produce and wood. Pop (tn) 2900; (com.) 29,300.

Frost, Robert Lee (1875-), Amer. poet, b. San Francisco. His father, a New Englander, d. when Robert was 10, and his Scottish mother, a teacher, moved to Lawrence, Massachusetts. After attending various schools and spending a year at Dartmouth, F. went to work in a Lawrence textile mill. From 1897 to 1899 he was at Harvard, but never got a regular degree, though he was later to have 16 honorary degrees. He was in turn teacher, cobbler, editor, and finally farmer for 11 years at Derry, New Hampshire. In 1912 he went to England and settled at Beaconsfield, where he met Rupert Brooke, Lascelles Abercrombie, Edward Thomas, and other poets. From this point his poetical career may be said to have begun. His first book of verse, *A Boy's Will*, 1913, was followed by *North of Boston*, 1914. In 1915 he returned to the U.S.A., where he was now famous, and became prof. of poetry at Harvard. He was 3 times awarded the Pulitzer Prize for poetry—in 1924, 1931, and 1937—and also received the medals of the Amer. Academy of Art and Letters in 1938 and of the Poetry Society of America in 1941. Though b. in California, his voice is the voice of New England, and he has been described as the purest classical poet of America. His works include *Mountain Interval*, 1916, *New Hampshire*, 1923, *West-Running Brook*, 1928, *A Further Range*, 1936, *A Witness Tree*, 1942, *A Masque of Reason*, 1945, *Sleeple Bush*, 1947, and *A Masque of Mercy*, 1947. His *Complete Poems* were pub. in 1949. See studies by G. B. Munson, 1927; and S. Cox, 1929; also C. Ford, *The Less Travelled Road*, 1935; L. Thompson, *Fire and Ice*, 1942.

Frost, that condition of climate when the temp. of the air is below the freezing-point of water; the term is also applied to manifestations in the form of small crystals of ice. Under ordinary conditions of pressure pure water solidifies at 0° C. or 32° F. Water containing substances in solution freezes at temps. somewhat below this point. Water contracts as it cools down to 4° C., but below that point it expands for a decrease in temp., and as it solidifies in a crystalline form it takes up more space as a solid than as a liquid. Therefore water-pipes are likely to burst

during a F., though the subsequent leakage is not discovered until the thaw, or period when the temp. has again risen above 0° C. The expansion of freezing water is also responsible for breaking off large pieces of rock when water has collected in cracks, and for the general disintegrating effects of F. upon soil and even vegetable structures. The general condition determining F. is diminution of temp. below 32° F., but in the Brit. Isles this does not obtain as an average condition, even through Jan., the coldest month of the year. There are therefore usually special circumstances connected with F.s, and it is necessary to distinguish between air F.s and ground F.s. Ground F.s can occur when the air temp. is above 32° F. and are caused by loss of heat by the ground because of radiation to space. Radiation loss is hampered by an abundance of water-vapour in the atmosphere, therefore ground F.s occur on clear nights when there is neither cloud nor wind. These conditions are characteristic of anticyclonic periods, that is, when there is a high barometric pressure and the air gently flows outwards from the anticyclonic area. As the likelihood of ground F. depends upon the freedom of the atmosphere from water-vapour, some indication of the probable night temp. may be gained from an examination of a wet- and dry-bulb thermometer; a good estimate is obtained by multiplying the difference between the wet- and dry-bulb readings by 24, and subtracting the result from the actual air temp. (dry bulb). Sometimes the frequency of F.s is affected by the nature of the land with regard to slope. On a calm night the heavier cold air tends to flow down the sides of hills to the valleys below; therefore plantations on the slopes of hills are not so liable to F. as those in the valleys. The effects of F. on agric. enterprise may be advantageous or the reverse, according to the seasonableness of the low temp. Thus a F. in winter helps to break up the ground and checks the growth of plants at a time when too early development might be dangerous. On the other hand, spring F.s often do great damage by destroying blossoms and fruit buds. The destructive action of F. on vegetation is due to the formation of ice on the outside of the cells, from which the water has been squeezed by the contraction due to low temp.: if the ice thaws rapidly the water cannot be reabsorbed by the cells in time, and either runs off and causes the plant to dry up, or collects in intercellular spaces and causes decay. As F.s do not often occur in the Brit. Is. when the air is humid, attempts are sometimes made to prevent a threatened F. by flooding the soil. This causes a bank of mist to rise up and serve as a blanket for the prevention of overmuch radiation. Protection from F. damage during the critical period of growth of fruit is usually obtained by the use of orchard heaters, small pots burning oil. This method is very popular in the citrus orchard areas of California. Small areas may be sufficiently protected from a light F. by

coverings of straw, paper, etc. See R. Bush, *Frost and the Fruit Grower*, 1945.

Frost Figures, or Ice-flowers, curved aggregations of ice-crystals, produced when hoar-frost is formed on a cold surface. The atmosphere contains a varying amount of water-vapour diffused in it. The exact amount is dependent on the physical configuration of a country, the prevailing winds, nearness to the sea, etc., and the amount that can be present in the atmosphere increases with its temp. When no more evaporation is possible the atmosphere is said to be saturated, and any decrease in temp. when this condition is estab. causes the deposition of the excess of water on any available surface. When this occurs at the surface of the earth, the water is deposited on the ground in the form of dew. Should the temp. drop to below 32° F. the water-vapour may be deposited as ice without passing through the intermediate liquid stage. In these circumstances small crystals of ice are formed, belonging to the hexagonal system of crystals. They have the habit of twinning; that is, 2 crystals may have a common face, but their axes may not be parallel. This phenomenon, when continued with crystal after crystal, produces a pattern of gradual curves, whose interpenetration and divagation produce a remarkable similarity to beautiful foliage. See ICE.

Frostbite, consequence of the continued action of great cold on parts of the body. Limited areas of the body may be frozen for a short period without risk, as in surgical operations. But when larger portions are frozen for considerable periods, especially when the circulation returns too soon, more outlying parts—say, the fingers in the case of a frozen hand—may perhaps die (see GANGRENE) and fall off. It is stated to be specially apt to occur in persons given to the use of alcoholic drinks, in whose blood-vessels loss of vitality is prone to cause sluggish circulation. If circulation does not return the part affected may simply shrivel up and turn black and gangrenous. But if the injury to the tissues is less severe circulation returns as the part thaws, and the vessels become swollen, red, and painful, sometimes with inflammation and subsequent gangrene. The condition is preventible by adequate covering of hands and feet, etc., when there is extreme cold; also by maintaining the circulation with movement. But when F. has occurred the patient should be put in a cold room, and the parts affected should, in traditional practice, be rubbed with snow or covered with somewhat cold water. Sometimes the pain can be relieved by lifting the limb. Later there can be gentle rubbing with oil, but the longer the part has been exposed to the cold the more gradual must be the course of treatment. When the circulation has returned the part may be lightly wrapped in cotton-wool.

Symptoms.—Here are some of the symptoms described by the vivid pen of the Amer. Rear-Adm. R. E. Byrd, in

Alone, 1939. Byrd experienced F. in its most virulent form, near the S. Pole in 1934. 'Times when the temperature was in the minus fifties or sixties, a wind would come rustling out of the cold, edged with a breath so sharp that it fairly sliced the skin from the face. (He had chemical heat pads in his sleeping clothes, and under his furs in the daytime.) Maybe my toes would first turn cold, and then dead. While I was dancing up and down to flex them and restore the circulation my nose would freeze, and by the time I had attended to that my hand would be frozen. The wrists, the throat where the helmet chafed, the back of the neck, and the ankles, pulsed and crawled with alternating fire and ice. Freezing to death must be a queer business. Sometimes you feel simply great. The numbness gives way to an utter absence of feeling. You are as lost to pain as a man under opium. But at other times, in the enfolding cold, your anguish is the anguish of a man drowning slowly in fiery chemicals.'

Treatment.—It must be pointed out that there is difference between orthodox medical tradition and the treatment advocated by the explorer, V. Stefannson, who, in *My Life with the Eskimo*, 1913, says: 'One of these superstitions is that, when your face or any other part of your body begins to freeze, you must thaw it out with an application of snow. Few things could be more absurd. Any high-school pupil could tell us offhand what would happen if liquid air were applied to a man's cheek or nose; of course the part would freeze instantly. The same would be true of the snow of carbon dioxide, and the same is true of snow or water, except, of course, that the freezing would not be so nearly instantaneous.' Stefannson's treatment was brief application of a warmed hand to the part affected.

Frottola, form of light part-song for 4 voices cultivated in Italy between about 1490 and 1530, with sophisticated and often elegantly indecent words set to music with a melodious top part and little elaboration of texture beneath. It led at the end of its period to the more polyphonic madrigal on the one hand and to a more diversified continuation of its own manner in the canzonet, villanella, and similar forms.

Froude, James Anthony (1818-94), historian, b. in Devon, and educ. at Westminster and Oriel College, Oxford. F. was originally associated with the Tractarians, but later lost his faith in organised religion. His *History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*, 1856-70, is his greatest work, and brought him great fame, but, though most admirably written, as a hist. it is not entirely reliable, F. being inclined rather to endeavour to support his own theories than to follow the facts elucidated by the documents from which he worked. Among his other books were *The English in Ireland in the Eighteenth Century*, 1872-4, *Oceana*, 1886, *The English in the*

West Indies, 1888, *The Life and Letters of Erasmus*, 1893, and *English Seamen in the Sixteenth Century*, 1895. His friend Carlyle (whose influence on F.'s views was enormous) appointed him his sole literary executor, and in that capacity he pub. Carlyle's *Reminiscences*, 1881, *History of the First Forty Years of Carlyle's Life*, 1882, *Letters and Memorials of Jane Welsh Carlyle*, 1883, and *Carlyle's Life in London*, 1884. His biography of Carlyle was vigorously attacked, and gave rise to a bitter controversy. F. was editor of *Fraser's Magazine* from 1860 for 14 years. He was rector of St Andrews from 1868, and regius prof. of modern hist. at Oxford, 1892-4. See A. Cooper, *James Anthony Froude* (a lecture), 1907; G. P. Gooch, *History and Historians in the Nineteenth Century*, 1913; and W. H. Dunn, *Froude and Carlyle: a Study of the Froude-Carlyle Controversy*, 1930.

Fruetidor (fruit-month), 12th month in the Fr. revolutionary calendar. See CALENDAR.

Fructose, or *Laevulose* (fruit-sugar), discovered by Dubrimant in 1847. A ketose (see SUGAR), $\text{CH}_2\text{OH}(\text{CHOH})\cdot\text{CO}\cdot\text{CH}_2\text{OH}$, contained in most sweet fruits, honey, and starches together with dextrose. Obtained pure by boiling inulin—a starch contained in dahlia tubers—with water, and together with glucose by the inversion of cane sugar. It is also obtained by hydrolysing sucrose with sulphuric acid. F. crystallises from alcohol, and has a melting point of 95° C. It is less easily fermented than glucose, is a powerful reducing agent, and is laevorotatory (see STEREOCHEMISTRY). It is sweeter than cane sugar and is more easily assimilated. It can be obtained as a syrup or as a granular crystalline. It is used instead of cane sugar by sufferers from diabetes. It was synthesised chemically in 1887.

Frugoni, Carlo Innocenzo Maria (1692-1768), It. poet, b. Genoa. At the age of 15 he was sent to a monastery, and forced to take monastic vows. In 1716 he was prof. of rhetoric at Brescia, and afterwards taught at Rome, Genoa, Bologna, and Modena. He became poet laureate to the duke of Parma, and was released from his monastic vows by the pope. His lyrics and pastorals are remarkable for their facility and elegance, and he was also a very successful writer of Lat. poetical epistles and operatic libretti.

Fruit, popularly the product of a shrub, tree, or plant, usually containing the seed, which may be eaten. Botanically a F. is the fertilised gynaecium of a flower, together with the adherent parts of the inflorescence that enlarge after fertilisation. When only the gynaecial structures are affected, the result is a true F.; when other parts, such as perianth, receptacle, etc., are involved the result is a false F., or pseudocarp. The rind or shell of a F. is derived from the wall of the ovary and is known as the pericarp, and is made up of 3 more or less distinguishable layers: the epicarp or outer epidermis, the endocarp or inner layer, and the mesocarp or



SOME TYPICAL FRUITS

1. Cypsela—Head of *Olearia haastii* in seed. 2. Cypsela—Single parachute seed of same. 3. Glans or Nut—Sweet Chestnut, cupule open, showing the three nuts. 4. Glans—Longitudinal section of nut of same. 5. Glans—A single nut of same. 6. Glans—Section of young fruit. 7. Capsule of *Euonymus europaeus*. 8. Capsule of same, open and empty. 9. Capsule of same, open, with seeds in position. 10. Samara—Single samara of Elm. 11. Samara—Single samara of Ash. 12. Samara—Double

mesophyll, a spongy middle layer. In pseudocarps the other parts combining with the ripened ovary are chiefly derived from the floral receptacle, as in the apple in which the true F. is the core, and the strawberry in which the carpels, forming the apocarpous gynaeceum, cover an enlarged fleshy receptacle. The terms pericarp, epicarp, endocarp, and mesocarp are not very applicable to pseudocarpic F.s. The classification of F.s is complex, but may be simplified as follows:

Dry Dehiscent Fruit.—Usually many-seeded, such F.s open or split on maturity to liberate the seed. Most capsules dehisce valvularly, the side walls (pericarp) splitting longitudinally, and breaking away in segments or valves. Splitting down the dorsal sutures is called loculicidal dehiscence; down the ventral suture, septicial dehiscence; while, if in either method the septa is broken across to leave the seeds as a free central column on the placenta, it is septifragal dehiscence. Some F.s, on dehiscent, throw their seed (e.g. balsam, geranium), others dehisce by pores (e.g. papaver), others by teeth (e.g. *Primula veris*), and others by the release of a lid (e.g. anagallis). Dehiscent F.s may be capsules, follicles, legumes, siliques, or pyxidiums which dehisce transversely.

Dry Indehiscent Fruit.—Includes most fleshy F.s. If with dry walls and 1 seed, the F. may be an achene, as in black medick; a caryopsis, as in grasses; a cypselia, as in the Compositae, or a nut, as in hazel or beech. Many-seeded, indehiscent F.s are known as schizocarps, usually break into 1-seeded parts, mericarps, and may be known as carcerules; if winged they constitute samaras.

Succulent Fruit.—Such F.s may be the berry, with a wholly succulent pericarp (e.g. gooseberry, grape, currant, etc.) or a drupe or stone F.

False Fruits are of many types, and include pome F.s (e.g. apple, pear, hawthorn, etc.), fig, pineapple, mulberry, and strawberry. When bracts enlarge, they may form a cover for F.s, or cupule, or wings (e.g. tilia). A knowledge of the flower and process of fertilisation are necessary for the understanding of any F. See FLOWERS; FERTILISATION; BOTANY; GARDENING. See also S. B. Whitehead, *Fruit from Trained Trees*, 1954.

Fruit, Drying of, see PRESERVING.

Fruit, Preservation of, see PRESERVING.

Fruit-bat, name given to all members of the Pteropodidae, a frugivorous family found only in the tropical regions of the E. and in Australia; they are variously called flying-foxes, flying-bats, and fox-bats. The heads of many of them are curiously fox-like, and their hair is a reddish brown. *Pteropus edulis*, the great kalong, is the largest of all bats, measuring nearly 5 ft across the wings. *Cynopterus marginatus* is the destructive and voracious Indian F.

Fruit Drinks, see COCKTAILS; COOKERY.

Fruit-farming, as distinct from market-gardening, comprises the cultivation of tree and bush fruit, including strawberries and raspberries. The agric. conditions, etc., are treated under the headings of the different fruits; a short account of the extent of F. in this country, and of the importation of fruit, will here be given. The growing popularity of the fruit industry may be gathered from the fact that the Ministry of Agriculture returns concerning the fruit areas of Great Britain show a continuous increase. The total area in 1888 was 199,178 ac., in 1901 234,660, and in 1953 about 314,000. The following are the areas devoted to F. by certain Eng. cos.: Kent, 60,000 ac.; Devonshire, 22,000; Worcestershire, 22,000; Herefordshire, 20,000; Somersetshire, 19,000; Gloucestershire, 14,000; Cambs and Isle of Ely, 11,000; Norfolk, 9,000; Sussex, 5,000; Essex, 5,000; Lincs, 4,000; Cornwall, 4,000; Suffolk, 3,500; Middx, 3,500; Shropshire, 3,500.

The acreage under small fruit cultivation (approximately 51,300 ac. in 1953), is about one-sixth of the total devoted to F. The prin. small fruits grown are strawberries, currants, gooseberries, and raspberries, while loganberries have increased in importance. Among the prin. strawberry-growing cos. are Cambs, Hants, Norfolk, and Worcestershire. The following is the proportion occupied by the various small fruits: strawberries, 18,000 ac.; raspberries, 10,100; currants and gooseberries, 21,300; other kinds, 1,900.

The following is the average crop per ac. of some of the fruits: strawberries, 32.7 cwt.; raspberries, 32.0; red currants, 38.7; black currants, 30.8; gooseberries, 41.9. Orchard trees represent a large proportion (274,000 ac.) of the fruit acreage, but much of this is devoted to unspecialised production. In 1953 the

samara of Sycamore. 13. Samara—Section of half of same, showing enclosed cotyledonous leaves. 14. Legume—Pod of Broom, closed. 15. Legume—Pod of Broom, open. 16. Berry—Wild Gooseberry. 17. Berry—Section of same (transverse). 18. Carcerulus—Fruit of *Phlomis fruticosa*, with part of calyx-tube. 19. Carcerulus—Fruit of *Phlomis fruticosa*, splitting into four nuts or achenes. 20. Drupe—Cherry. 21. Drupe—Section of same, showing stone. 22. Drupe—Complete section of same, showing kernel within stone. 23. Pome—Crab-apple. 24. Pome—Transverse section of same. 25. Pome—Longitudinal section of same. 26. Aetaerio of Follicles—*Magnolia conspicua*. 27. Aetaerio of Follicles—Vertical section of same. 28. Aetaerio of Drupes—Blackberry. 29. Aetaerio of Drupes—Vertical section of same. 30. Cynarrhodium—Dog-rose. 31. Cynarrhodium—Vertical section of same. 32. Strobilus—Spruce Fir, closed cone. 33. Strobilus—Spruce Fir, winged seeds of same, within scale. 34. Strobilus—Weymouth Pine, open cone.

acreage of various orchard fruits and production per ac. were: apples (dessert and eating), 129,300 ac. and 76.8 cwt.; cider apples, 3800 and 37.0; pears (dessert and eating), 16,700 and 42.4; plums, 41,000 and 39.0.

F. is an uncertain industry, and a moderate crop in a bad year will probably yield more profit than a good crop in a very good year, when the market will consequently be glutted. A large amount of labour is required, but in some cases the profits have compensated for this. It is, however, in the cultivation of fruit, principally grapes and tomatoes, under glass that the largest fortunes have been made. About 12 tons of grapes and 33 tons of tomatoes may be grown to the ac. by this method. Owing to the perishable nature of the produce, few industries are more precarious in this respect, and great developments are possible in the direction of systematic marketing in the interest of the producer. Experiments have been tried with considerable success along co-operative lines, the growers in a dist. (as in the Pershore dist. of Worcestershire) combining to form a market of their own from which supplies can be forwarded with the minimum of delay and expense to places where the demand is good. Another development which considerably enhances the profitable character of F. and diminishes its risks is the provision of factories and other facilities for preserving the surplus produce by canning or one or other of the various methods outlined in PRESERVING.

The great proportion of fruit grown in the Brit. Isles is produced as a side line on farms and in market gardens, and falling a highly elaborated system of marketing, within easy distance of a fruit farm, and falling also a specially well suited climate and soil, this is undoubtedly the best method of undertaking fruit culture. The grower is then not seriously dependent on the vagaries of the season, and can usually make good use of a considerable part of the land occupied by the fruit crops, as by pasturing sheep in the orchard, or by enclosing it in a series of poultry runs.

Importation of Fruit.—F. is carried on extensively in all the dominions and in many colonies, and in foreign countries. By the process of canning, and by the use of refrigerating chambers on board ships, fruit can now be transported to any part of the world.

The estimated consumption of fresh and processed fruit in Britain in 1954 was about 123 lb. per head of the pop., which is only slightly less than pre-war. Although Brit. imports of fruit since the war have been much smaller than in 1934-8, total supplies have not been greatly reduced because the home supply of fruit has been doubled. Imports into Britain in 1954 totalled 1,033,800 tons, of which nearly half came from Commonwealth countries. The classes of fruit imported were (in thousands of tons): citrus, 459.8; bananas, 290.7; deciduous and other fruit, 233.3.

See the articles on the various fruits, and GARDENING; and N. B. Bagenal, *The Fruit Growers Handbook*, 1949; N. P. Seabrook, *Modern Fruit Growing*, 1951; Royal Horticult. Society, *The Fruit Garden Displayed*, 1951; R. Bush, *Penguin Handbooks on Fruit-Growing*, 1951.

Fruit Sugar, see FRUCTOSE.

Fruit Wines, see WINES, HOME-MADE.

Frumentius, St (c. AD 300-80), apostle of Ethiopia, b. at Tyre. He was captured by the Abyssinians, whom he converted to Christianity, and he was consecrated bishop of Aksum about 336. His feast is on 27 Oct.

Frundsberg, Georg von (1473-1528), leader of the Ger. Landsknechte (free-lances) during the It. wars of Maximilian and Charles V, was b. at Mindelheim in Swabia. He fought for Maximilian against the Swiss in 1499, and in 1504 took part in the war in the Netherlands. In 1509 he won fame in the war against Venice, and in 1513 and 1514 was again occupied with the Fr. and Venetians. He gained a victory at Bicocca in Italy in 1522, was partly responsible for the defeat of the Fr. at Pavia, 1525, and suppressed a peasant revolt in Germany the same year.

Frunze, Mikhail Vassilievich (1885-1925), Russian revolutionary gen., b. Pishpek (renamed F. in 1926), son of a peasant, settled in Turkestan and became a surgeon. Sent to Siberia, 1914, but escaped, and again heard of at Minsk, 1917. Defeated Koltchak, 1919; fought Wrangel successfully, 1920. In 1924 president of the Revolutionary Military Council. In Jan. 1925 became people's commissary for military and naval affairs.

Frunze, tn (formerly Pishpek), cap. and region of the Kirgiz S.S.R., Soviet Central Asia, 150 m. S. of SW. extremity of Lake Balkhash. Grain is cultivated and there are cotton mills and tobacco factories. Pop. 155,000.

Frusino, see FROSINONE.

Frustum, portion cut off from any solid figure. The term is most frequently applied in the case of the cone, and conoidal surfaces of revolution. By 'frustum of a cone' is meant any part cut off from a cone which does not contain the vertex. This distinction is drawn because any part of a cone which contains the vertex is still a cone.

Fry, Charles Burgess (1872-1956), Eng. athlete and journalist. Educ. at Repton and Wadham College, Oxford. Captained Oxford at cricket, association football, and athletics; as an undergraduate he set up the world record for long jump. He was a football international, and captained England at cricket against Australia and South Africa in the Triangular Tests, 1912. A pioneer of scientific back-play, F. was a magnificent driver, pre-eminent in his generation of batsmen. In 1901 he made 6 hundreds in succession—a feat equalled only by Sir D. Bradman. His *Cricket*, 1912, is a fine treatise on batting; he founded and ed. *Fry's Magazine*. From 1908-50 he commanded

the training ship *Mercury*. See his autobiography, *Life Worth Living*, 1939, 1948.

Fry, Christopher (1907-), playwright, b. Bristol. Educ. at Bedford Grammar School, he was a schoolmaster for a few years, then turned to the stage and was in turn actor, script writer, and producer. From 1934 to 1938 he was director for the Tunbridge Wells Repertory Players, and in 1939 and 1940 his pageant plays *Thursday's Child* and *The Tower* were performed. In 1940 he became director of the Oxford Playhouse, but was called up and served in the Second World War from 1940 to 1944. In 1946 his play *A Phoenix Too Frequent* appeared, to be followed by *The Lady's Not for Burning*, 1949, *Venus Observed*, 1950, *A Sleep of Prisoners*, 1951, and *The Dark is Light Enough*, 1954. *The Firstborn*, 1946, shows his tragic power. Written in flexible verse, his plays form a landmark in the revival of poetic drama in England. See study by D. Stanford, 1951.

Fry, Sir Edward (1827-1918), judge, b. Bristol. He was educ. at Univ. College, London, and London Univ. and was called to the Bar in 1854. From 1877 to 1883 he was judge of the high court chancery div., and in 1883 was made lord justice of appeal, but resigned in 1892. He presided over the royal commission on the Irish Land Acts, 1897-8, and was conciliator in the S. Wales colliery dispute, 1898. He was chairman of the court of arbitration under the Metropolitan Water Act, 1902; and ambas.-extraordinary and first Brit. plenipotentiary to The Hague Peace Conference in 1907. He wrote *Essays on the Accordance of Christianity with Nature of Man*, *The Doctrine of Election*, 1864, *James Hack Tuke*, 1899, *Studies by the Way*, 1900, and *The Liverworts*, 1911. See Agnes Fry, *Sir Edward Fry*, 1921.

Fry, Edwin Maxwell (1899-), architect and town-planner; b. Wallasey; educ. Liverpool Univ.; worked as partner with Messrs. Adams and Thompson after 1927; then with W. Gropius (q.v.), designing with him Impington Village College, 1937. Was town-planning adviser in West Africa, 1943-5, in partnership with his wife, née Jane Drew. In 1951 he was appointed senior architect for the new cap. of the Punjab at Chandigarh (see 'LE CORBUSIER'). Other buildings include Sun House, Hampstead, 1935; Kensal House flats, London, 1937; educational buildings, Gold Coast (Ghana), 1946-53; Univ. College, Ibadan, Nigeria, 1954.

Fry, Elizabeth (1780-1845), prison reformer, was a daughter of John Gurney, Quaker banker of Norwich, and was b. there. In 1800 she married Joseph F., Quaker banker and tea merchant, related to the Frys of Bristol. She worked, life-long, to alleviate the conditions of women prisoners which were then indeed terrible. The usual punishments were transportation or death. In 1813 she began to visit and to teach and occupy the women in Newgate prison with their children. In 1817 she formed

an association for the improvement of conditions, and her work extended to other prisons. For 25 years she visited every ship bound with women convicts for Australia, arranging instruction and occupation. Her unflinching devotion, magnetic personality, reports to authority, and pub. pamphlets enlisted public sympathy, led to enquiry, and then to reforms. Later she carried her work to continental prisons. In addition she brought up 10 of her 11 children and was active in promoting schools and in the improvement of sick-nursing. There are lives by her daughter, Mrs Cresswell, 1845; Susanna Corder, 1853; G. King Lewis, 1910; and Janet Whitney, 1937, and sev. reprints.

Fry, Joseph (1728-87), Quaker chocolate manufacturer and type founder. He settled in Bristol as a doctor, but later turned his attention to commercial projects. He helped Richard Champion in his Bristol china works, was partner in a firm of soap-boilers, and owned some chemical works at Battersea. He was the founder of the Bristol firm of chocolate manufacturers, having purchased the patent right from Wm Churchman. In 1764 he became interested in type-founding, and entered into partnership with the first printer of the *Bristol Gazette*, Wm Pine. The business soon moved to London, where he assumed complete control of it in 1776. After his death the chocolate firm, which was the first of its kind, was carried on by his widow, Anna, and his son, Joseph Storrs. The factory expanded rapidly, and a Watt's steam engine was purchased in 1798 so that the cocoa beans could be ground by steam. In 1896 the business was converted into a private limited company, under the directorship of members of the F. family. Building began at a site in the country outside Bristol in 1921, and the whole factory was transferred there in the course of 13 years. See also COCOA and CHOCOLATE.

Fry, Mrs J. P., see KAYE-SMITH, SHEILA.

Fry, Roger Eliot (1866-1934), painter and critic; son of Sir Edward F. (q.v.). Educ. at Clifton College and King's College, Cambridge Univ. Was a pupil of Francis Bate and also studied in Paris. He first attracted attention by the exhibitions of 'Post-Impressionist' paintings which he organised in 1911 and 1913. The ensuing controversy strengthened his views, and it was to him that the belated recognition of Cézanne in Britain was due. He ed. the *Discourses* of Sir Joshua Reynolds, 1905, and wrote monographs on Giovanni Bellini, Matisse, and Paul Veronese; but his merits as an artistic philosopher will be estimated rather on such pubs. as *Vision and Design*, 1920, *Transformations*, 1927, and *Reflections on British Painting*, 1934—works which showed great aesthetic sensibility and had much influence. His last work, *Last Lectures*, was pub. posthumously, 1939. For a time F. was curator at the Metropolitan Museum, New York, and in 1933

he was appointed Slade prof. of fine art at Cambridge.

Fryatt, Charles Algernon (1872-1916), master-mariner, b. Parkeston, Essex. When the submarine policy of the Ger. Gov. came into force on 18 Feb. 1915, it became F.'s constant business to cross a war zone where his ship was liable to be sunk without warning. On 28 Mar. 1915, when navigating the S.S. *Brussels* from Parkeston to Rotterdam, he was met by a submarine U33 near the Maas lightship. He disregarded the signal to stop, and steered straight for the submarine, which escaped by diving. On the night of 23-24 June 1916, steaming home from the Hook of Holland, the *Brussels* was captured by a torpedo-boat flotilla and taken to Zeebrugge. F. was tried (for his alleged offence of 28 Mar. 1915) at Bruges, 27 July 1916, and shot the same day.

Frydlant (Ger. Friedland), Czechoslovakia in the region of Liberec (q.v.). The anct castle belonged to Wallenstein (q.v.), who was duke of F. Textiles are manufactured. Pop. 4500.

Frying, see COOKERY.

Fryth, John, see FRITH, JOHN.

Fryxell, Anders (1795-1881), Swedish historian, educ. at Uppsala. His chief work is *Berättelser ur Svenska Historien* (trans. 1844), a hist. of Sweden from the earliest times to the death of Gustavus III, which took 46 years to complete.

Fuad I (Ahmed Fuad) (1868-1936), king of Egypt, youngest son of Khedive Ismail Pasha. In 1917, on the death of his elder brother, Sultan Hussein Kemal (q.v.), F. became sultan, and, the Brit. protectorate coming to an end, he was proclaimed king on 16 Mar. 1922. In 1928 the constitution was suspended, but was restored in 1929. On his death he was succeeded by his only son, Farouk (deposed on 26 July 1952).

Fuchow: 1. City of China, in the prov. of Kiangsi, an important seat of trade in native paper, and linen.

2. (Fukien prov.) See FOOCOW.

Fuchs, Leonhard (1501-66), Ger. botanist, b. Memmingen, Bavaria. He studied classics at Ingolstadt under Reuchlin, and became prof. of medicine at Tübingen in 1535. Soon he took up the pursuit of botany, of which he must be looked upon as one of the fathers. His most important work on the subject is *De Historia Stirpium Commentarii Insignes*, 1542. This work is beautifully illustrated by woodcuts, and gives a clever description of domestic plants alphabetically arranged. In it F. laid the foundation of a permanent botanical nomenclature. The fuchsia was named after him.

Fuchs, Sir Vivian Ernest (1908-), scientist and explorer. He led and took part in expeditions to Africa and to Greenland before the Second World War, and from 1947 to 1950 he organised the Falkland Is. Dependencies Survey in the Antarctic. He was director of the Falkland Is. Dependencies Scientific Bureau from 1950 to 1955, and in 1955 became leader of the Brit. Trans-Antarctic Expedition. He left Shackleton Base on the Weddell

Sea on 24 Nov. 1957 with a party of 12 in 3 Snocats, 2 Weasels, and 1 Muskeg, and reached the S. Pole on 19 Jan. 1958. Depot 700, which had previously been estab. by Sir Edmund Hillary (q.v.), was gained on 7 Feb.; thenceforward the party was guided by Hillary to Scott Base on McMurdo Sound, arriving there on 2 Mar. 1958. F. thus became the first explorer to traverse the Antarctic, completing 2200 m. in 99 days.



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SIR VIVIAN FUCHS

Portrait taken at the South Pole, just after his arrival.

Fuchsia (Neo-Lat., named after Leonhard Fuchs (q.v.), a genus of plants of the family Onagraceae, containing more than 50 known species, mostly natives of tropical America. The majority are shrubs, but some are arborescent or climbing. The flowers are generally pendulous, 4-petalled, and of a brilliant and delicate colouring, red, purple, and white. The leaves are opposite and verticillate. F.s are much cultivated as greenhouse plants, and for bedding-out. *F. magellanica* is fairly hardy, and its variety *riccartonii* is often used for hedges in Cornwall and in Ireland.

Fuchsin, aniline dyestuff of a magenta or red colour, consisting of a mixture of the hydrochlorides or acetates of pararosaniline and rosaniline. In commerce F. is known by various names, such as magenta, rubine, roseine, etc., and was at one time widely used for dyeing purposes. Occasionally it is also employed for the colouring of confectionery and wines. See ANILINE; DYE.

Fucino, or Celano, Lake of (anct Lacus Fucinus), lake bed in Italy, in Abruzzi e Molise (q.v.), 20 m. SSE. of L'Aquila (q.v.). The level of the lake was subject to great variations, owing to lack of an outlet, and disastrous consequences frequently resulted from this. Claudius I (q.v.) constructed a tunnel in AD 37 by which the surplus waters were carried to the Liris (see GARIGLIANO); it is uncertain when this went out of use, but various attempts were made to re-open it from

1940 onwards. In 1854-75 the lake was finally drained, and the bed is now cultivated.

Fuegians, nomadic aborigines of Tierra del Fuego. They are divided into 3 distinct groups, the Onas, the Yahgans, and the Alacalufs, in the E., centre, and W. of Tierra del Fuego respectively. The Yahgans are the true aborigines. Very little is known of the Alacalufs, but they are probably of Araucanian descent. The Onas are similar to the Tehuelche Patagonians in their tall stature and the nomadic life they lead. The F. have dark brown, copper-coloured skins, and plentiful coarse black hair. They hunt and fish to supply themselves with food, and live in huts formed of tree-trunks and branches. They obey no chief, and do not appear to believe in a future life, though they are afraid of invisible beings and spirits. They have been largely exterminated by white sheep farmers, who regarded them as vermin to be hunted and shot. See J. H. Steward, *Handbook of South American Indians*, vol. i., 1946; E. Lucas Bridges, *Uttermost Part of the Earth*, 1948.

Fuego, see TIERRA DEL FUEGO.

Fuel, invariably carbonaceous materials which give out heat (q.v.) in combining with oxygen. The amount of heat which a F. gives out during combustion naturally has a great influence on its value for commercial purposes, and this will be considered in detail. F.s may be divided into 3 classes: natural, prepared, and liquid and gaseous F.s. To the first class belong wood, peat, lignite, and all kinds of coal; to the second belong compressed F., such as briquettes, etc., prepared peat and wood, charcoal, and coke; in the third class are found petroleum and its extracts, alcohol and certain hydrocarbons, such as benzole and naphthalene, coal gas, natural gas, water gas, and producer gas.

The heating or calorific power of a F. is the quantity of heat generated by the combustion of a unit weight. The heat is measured in units; the standard unit now adopted in Britain is called the Brit. Thermal Unit (B.t.u.) (q.v.), and is the quantity of heat required to raise 1 lb. of water by 1° F. when at its maximum density, i.e. from 39.1° to 40.1° F. The scientific unit of thermal value is the calorie (q.v.), which is the amount of heat required to raise a unit weight of water (at 39.1°) 1° C. Heat may be stated in calories or B.t.u. for comparative and calculating purposes, but to engineers the evaporative duty of the coal is of the most importance, and this is usually stated as so many pounds of water at 100° C. (212° F.) converted into steam at the same temp. In the case of tn gas, to facilitate calculation, the 'therm' was introduced by the Gas Regulation Act. One therm is equivalent to 100,000 B.t.u.s.

An important point with F.s is the quantity of inorganic matter they contain, as this constitutes the ash, the amount of which is an important factor in the suitability and economy of the F. In addition to the F.s enumerated above,

various kinds of vegetable refuse, such as brushwood, straw, cotton, stalks, etc., are used for heating purposes where better fuel is lacking. In various parts of France and Germany tan cakes made of the spent bark used by tanners are employed as F. A common F. in India and Egypt is the dung of camels and oxen, which is moulded into thin cakes and dried in the sun; these have very little calorific power, and are characterised by an acrid ammoniacal vapour during combustion. The salient characteristics of the various F.s are briefly as follows:

Wood.—The value of wood (q.v.) as F. varies with the amount of moisture therein and the ash which remains after combustion. Even after prolonged drying wood will contain from 17 to 20 per cent of moisture. The percentage of moisture in a few varieties of fresh-cut wood is as follows: hornbeam, 18.6; sycamore, 27; oak, 34.7; pine, 39.7; elm, 44.3; larch, 48.6; poplar, 51.8. The percentage of ash in wood is on the average between 2 and 3. The calorific value of wood is low, as much heat is required to consume the moisture, and the percentage of hydrogen is very low. The charcoal which is made from wood has about a quarter of the weight of the wood used, and double the calorific value of an equal weight of wood.

Peat (q.v.) is formed of vegetable matter, such as mosses and aquatic plants, which, by the agency of pressure, have in time become converted to the spongy brownish-black substance which is found in peat bogs. When cut out in square blocks and air-dried in the usual manner, its calorific power is roughly equal to that of wood. When the peat is excavated and compressed into briquettes by machinery, however, a really valuable F. is produced which will bear comparison with the best coal. Peat represents an intermediate formation between wood and coal. Peat, or 'turf,' is an important factor in the economy of the Rep. of Ireland, where it is processed by the most modern methods.

Coal (q.v.) may be classified into 3 main varieties: lignite, bituminous, and anthracite. Lignite or brown coal is the least carbonised of any coal, showing indications of organised structure, and containing a considerable proportion of hydrogen and oxygen. Most of the coals found in the Brit. Isles are bituminous in character; there is a larger variety in this class of coal, which includes steam coals, coke and furnace coals, gas coals, and household coals. The coals which are most used for the house and general use are non-caking long-flame coals. From 70 to 80 per cent of carbon is contained in them, but little available hydrogen; their sp. gr. is about 1.25. The coals which are most used for the manuf. of gas contain from 80 to 85 per cent of carbon, with a sp. gr. of about 1.3. Coking and furnace coals burn with a smoky flame of varying luminosity, and contain in some cases nearly one-third of volatile hydrocarbons. The best steam coals are

anthracite in character, being difficult to ignite and without much tendency to smoke. The sp. gr. varies from 1.34 to 1.44, and the percentage of carbon from 90 to 98. Anthracite coals are hard and dense in character, with a metallic lustre. Intense heat without flame or smoke is generated by anthracite, but as a powerful draught is required and ignition is difficult it is chiefly used in furnaces and engineering works. The sp. gr. of anthracite varies from 1.4 to 1.6 and the percentage of carbon is as high as 98.

Coke (q.v.) has been prepared from coal for many years, but it was not until 1800 that the preparation of coke was carried out on scientific principles, great improvements being effected. For many metallurgical processes coke is specially prepared in coke ovens from well-washed small coal. The chief requisites of a good coke are strength, infusibility, a low percentage of sulphur, and a high calorific power. The constituents of a first-class coke should be 92-98 per cent carbon, 5.22 per cent ash, 1.3 per cent oxygen, 0.27 per cent sulphur, and 0.23 per cent nitrogen. According to theoretical calculations coke should be slightly more efficient from a heating point of view than coal, but in actual practice the results are about equal. There are certain varieties of coal which can be used most economically, for firing boilers, furnaces, and kilns, when in a powdered form. As a result pulverised F. has developed considerably of late.

Liquid Fuel.—The use of liquid F.s may be said to date from the middle of the 19th cent. Of late years their use has greatly extended for steam raising and small furnaces, as well as for various types of engine. Petroleum distillates, residues, and cracked products represent the chief source of liquid F.; alcohol is used to a very small extent; benzole is recovered from coal and is used as a motor F. The lighter fractions of petroleum, such as gasoline and kerosene, are well suited for internal combustion engines such as those in motor cars, while the heavier fractions and residues are used in other types of engine and for heating purposes. At the present time the U.S.A., the U.S.S.R., the Middle East, and Venezuela supply most of the petroleum of the world, but oil has been found in many other places. Most F. oils have about 85 per cent of carbon, from 10 to 13 per cent of hydrogen, and remainder of oxygen, etc. Weight for weight the heating power of oil F. is about 40 per cent greater than that of good coal.

The chief advantages of liquid F. are (1) greater calorific power and less weight; (2) occupies less space; (3) convenience of storing and loading; (4) greater speed in getting up steam; (5) complete control over combustion. Against these must be set the danger of explosion of stored oil, loss by evaporation, and in some localities increased cost. In oil engines the oil vapour is exploded with air in the cylinder, the heat thus generated providing the motive power. When used for producing heat the oil is injected into the

furnace in the form of a spray. The most generally used method now consists of the direct atomisation of the oil so as to drive it direct into the furnace chamber in spray which is so finely divided as to act almost as a gas, thus ensuring complete combustion. This atomising action is carried out either by forcing the oil out from a jet at a considerable pressure, or by injecting it with steam or air, or a combination of the two. The former method is applied in burners for boilers in ships and in power stations. The F., after being heated to a temp. of 200-300° F., is introduced at high pressure through tangential channels into the base of a conical swirl chamber. Rotating rapidly as it passes through the swirl chamber, it emerges from the orifice at the apex of the cone and disintegrates into a network of fine droplets. The second method, which is applied in many different kinds of burners, is based essentially on the principle of the scent spray; a stream of air or steam impinges on an issuing stream of oil in such a way as to disperse it in the form of a fine spray. Blast burners, as these are called, are used in crucible furnaces, heaters for metal forging, furnaces for grain driers and bakeries, etc. The air used for atomisation is usually insufficient for complete combustion of the F. For each pound of oil F., 15-20 lb. of air are consumed in combustion, and in consequence special air control systems must be installed in oil-burning furnaces to ensure adequate air supplies. Oil F.s are often extremely viscous and have to be raised to temps. of 100-250° F. for pumping. Although there is great variation in F. oil specifications, a legal minimum flashpoint of 150° F. is given in many countries as a safety precaution. Oil F. is used for firing pottery, brick and lime kilns, metallurgical furnaces of all kinds, glass-making furnaces, and pot furnaces in the manuf. of paints and varnishes. Lighter grades of oil F. are also used in domestic central heating systems and for cooking on an institutional scale.

Gaseous Fuels are now used in many metallurgical processes, as in the Siemens-Martin steel process. Re-heating and other furnaces also use gaseous F.; and in the various types of gas engine gas is extensively used as a prime motor. Large quantities of combustible gases are obtained from the earth in the U.S.A., Russia, China, and other places; these are known as 'natural' gases. Natural gas found in parts of the U.S.A. and U.S.S.R. contains from 80 to 90 per cent of methane, and is the most valuable of gaseous F.s from a calorific point of view.

Manufactured gases are of 4 main varieties: (1) coal gas, produced by the distillation of coal in closed retorts; (2) water gas, made by the action of steam on incandescent carbon; (3) generator or producer gas made by the passage of air through incandescent carbon; (4) mixed producer and water gas, called semi-water gas, made by the passage of both air and steam over highly heated F. Coal gas is used for lighting, heating, and

cooking purposes and for gas engines; it is much in favour for both power and F. When coal gas is used for the latter purpose it is burnt at a very high temp., mixed with air in atmospheric burners; important features are the absence of mess, dirt, and smoke, and the ease and exactitude with which it can be regulated. Water gas depends for its formation upon the fact that at a high temp. carbon has a greater affinity for oxygen than has hydrogen, and that when steam and carbon in any of its amorphous forms are heated to such temps., the steam is decomposed, with liberation of either carbon monoxide or carbon dioxide, according to the temp. and the quantities of steam and carbon interacting. The value of water gas thus produced depends on the closeness of the approximation to ideal conditions. Water gas is largely used for welding and other engineering works, and, when mixed with the gases formed by the decomposition of various grades of oil, forms the basis of carburetted water gas. Water gas is also used as the starting material in the manufacture of many important chemicals. Producer gas, which possesses the least thermal value of the 4 varieties, is a mixture of carbon monoxide and nitrogen. Air is passed through a column of heated coke, when the carbon at the lower surface thereof combines with the oxygen of the air to form carbon dioxide; this is turned into carbon monoxide by contact with the heated carbon over which it has to pass, and, in combination with the residual nitrogen from the air, forms producer gas. Siemens's producer gas differs from ordinary producer gas in that small coal or slack is used instead of coke. The gas thus produced has a higher thermal value. Mond's gas is an extremely cheap form of producer gas, made from a cheap bituminous coal slack. Arrangements exist in the process for the recovery of ammonia, which in other producers is wasted, and a sufficient quantity is recovered to pay for the F. used, thus compensating for the low calorific power of the gas. The large amount of carbon dioxide and nitrogen present accounts for the low thermal value of producer gas. Gas generators which work on the suction system find considerable use for the working of gas engines. The charge of gas is drawn into the engine directly from the producer, in which a mixture of air and steam is drawn over red-hot anthracite. The cylinder is in direct communication with the producer, and the back stroke of the piston causes a fresh mixture to be drawn over the anthracite. A cheap form of gaseous F. is thus obtained, when required, by a self-contained plant.

Instruments for finding the heating value of a F. are known as calorimeters. In all calorimeters the method adopted is to burn a weighed quantity of the F. in oxygen so as to impart the heat produced to a known quantity of water. The many varieties in use differ in the method of carrying out the combustion of the F. and of imparting the heat to the water, but may all be referred to one or other of 3

types: (1) where the combustion of the F. is effected with the admixture of a solid oxidising agent, as is done in the Lewis Thompson calorimeter; (2) where the combustion is carried out in oxygen at constant pressure (a) when the temp. of the escaping gas is undetermined, as in the Wm Thomson calorimeter; (b) when the temp. of the escaping gas is under control, as in the Fischer calorimeter; (3) where the combustion is carried out with oxygen at constant vol., as in the Berthelot, Mahler, Mahler-Donkin, or Mahler-Krocker calorimeters. The bomb calorimeter, belonging to the third class, is the most accurate, but that of Lewis Thompson is the most widely used, although the least accurate, as it is very easy to manipulate. All the above calorimeters are primarily designed for solid F., and if liquid F.s are to be tested, the platinum crucible or holder should contain kieselguhr, on to which the oil should be dropped. For testing the heating power of a gaseous F. a Simmance-Abady calorimeter is one of the best; this is a modification of the original Junker calorimeter.

With the introduction of the Gas Registration Act, recording calorimeters, which give a continuous record of the heating value of the gas, have come into use. These ingenious instruments correct automatically for changes in barometric pressure, temp., humidity, and sp. gr. of the gas. The most important types are the Fairweather and the Thomas. The Simmance-Abady calorimeter is easily modified for use with light oils, alcohol, etc.; a small lamp on a sensitive balance is used instead of a gas burner and meter. For further details see the articles on FISCHER-TROPSCH PROCESS; GAS; HEAT; COAL; and CARBONISATION, and the various gases herein mentioned. See also E. J. Mills and F. J. Rowan, *Fuel and its Application*; P. Bateson, *Fuel Purification*, 1891; Sir E. Lowthian Bell, *Gaseous Fuel* (J.I.S.I., vol. ii), 1889; R. Galloway, *Fuel*, 1904; H. L. Payne, *Fuel Value of Gases*; V. B. Lewes, *Oil Fuel*, 1913; J. H. Nicolls and C. B. Mohr, *Fuel Analysis*, 1934-36, 1937; Ministry of Fuel and Power, *The Efficient Use of Fuel*, 1944; H. M. Spiers (ed.), *Technical Data on Fuel*, 5th ed. 1950; J. S. S. Brame and J. G. King, *Fuel: Solid, Liquid and Gaseous*, 5th ed. 1955; The Shell Petroleum Co., *Oil Fuel*, 2nd ed. 1956.

Fuel Research Station, section of the Dept of Scientific and Industrial Research, estab. at Greenwich in 1918. It is primarily concerned with the more efficient use of fuels and its research programmes include work on the improvement of combustion in boilers with consequent reduction of smoke, improvement in the efficiency of domestic heating equipment, production of freely burning coke for domestic use, gasification, production of synthetic oils and chemicals from coal, flow properties of residual fuel oils, and recovery of sulphur compounds from flue gas. The station also organises the nation-wide survey of atmospheric

pollution carried out by local authorities and others. Results of research are pub. as ann. reports by H.M.S.O.

Fuelling Stations, see **BUNKERING STATIONS**.

Fuente Podrida, see **REQUENA**.

Fuenteovejuna, Sp. tn in the prov. of Córdoba. It was once a stronghold of the Order of Calatrava. It has a meat-curing industry, and is a centre for coal, mica, and argentiferous galena mines. Pop. 20,000.

Fuenterrabia (Basque *Ondarrabia*; Fr. *Fontarabie*; Eng. *Fontarabia*), Sp. fishing tn in the prov. of Guipúzcoa, on the bay of Biscay and on the Fr. frontier. Long an important fortress, its successful defence against Condé (q.v.) in 1638 is still celebrated. It has many fine buildings and the remains of an anct castle. Milton confuses F. with Roncesvalles (*Paradise Lost*, I. 587). It is a fashionable holiday resort. Pop. 5800.

Fuero (Lat. *forum*), in Sp. law a term of wide import, but generally used to denote (1) general codes of law, or bodies of customs, such as the F. Viejo of AD 990 and the F. Juzgo; and (2) special tribunals having jurisdiction in cases relating to certain depts, such as the army and navy or the post office. F. Juzgo was the code of laws estab. by the Visigoths as the *forum judicum*, which later, after the reconquest of Spain in the middle of the 13th cent. by the Christians, continued to be administered by separate courts and judges for the Mozárabes, i.e. Christians who had lived under Muslim rule and assimilated themselves to the Arabs. This F. applied to Mozárabes wherever no provision was made by royal privilege, or by special charters, or F.s as they are also called, such charters or F.s being, as in medieval England, privileges granted to cities or tns in consideration of the payment of dues to the owner of the land. No common tribunal administered the F. Juzgo, and it was subject to a great number of local jurisdictions. Many of its provisions are still in force, but a number of unchartered tns in 1260 adopted the F. Real, a code promulgated by Alonzo el Sabio in 1255, as a preliminary to a larger digest or code called *Las Siete Partidas*. But the latter, even when formally promulgated a century later, was expressly made subject to all existing F.s. The F. de Salamanca was a code of civil law promulgated at the beginning of the 12th cent. for Salamanca, and there were a number of other such municipal F.s for the government of different tns and the administration of justice in them. Spain was early the home of a highly specialised local gov., acknowledging scarcely any relation to a central administration. In the provs. these written or unwritten codes of laws relating to legislative, judicial, and administrative functions were called F.s or *foros*; those of the tns, *carlas-pueblos* (tn or vill. charters). Like the common law of England, or rather the special customs (see **COMMON LAW**; **CONSUETUDINARY CUSTOMS**), these F.s owed their strength to

their immemorial antiquity, although unlike Eng. customary law they owed their formal recognition to some royal grant or grant by a lord paramount. As in England, some Sp. monarchs, e.g. the Castilian, were bound on their accession to swear to observe the F.s, but when Spain became united under an absolute monarchy most of the F.s were openly violated, one marked exception, however, being the F.s of the Basques. See F. M. Marina, *Ensayo historico-critico sobre la antigua legislacion y principales cuerpos legales de los reynos de León y Castilla*, and M. de Colmeiro, *Curso de derecho politico segun la historia de León y de Castilla*, 1873.

Fuerteventura, or **Forteventura**, one of the Canary Is., in the prov. of Las Palmas (q.v.). It is in the E. of the archipelago, separated from Lanzarote by the channel of Bocaina. Its cap. is Puerto de Cabras, on the E. coast. Area 666 sq. m.; pop. 15,000.

Fuessli, Johann Heinrich, see **FUSELI, HENRY**.

Fugger, Swabian trading family, who lived at Augsburg, and who became so wealthy that they frequently financed the military expeditions of Ger. monarchs. The founder of the family was Johann (or Hans) F., a master weaver of Graben, near Augsburg. His son, Johann, became a citizen of Augsburg by marriage and an assessor of the dreaded *Vehmgericht* (see **VEHMIC COURTS**). His eldest son, Andrew, known as 'the rich Fugger,' became the founder of a noble line, F. von Reh, which became extinct towards the end of the 16th cent. Jacob, the second son of Johann, and the first of the family who owned a house in Augsburg, became head of the guild of weavers. His sons, Ulrich, George, and Jacob, all men of great energy and resource, enormously increased their patrimony—Ulrich as a trader of varied operations, and Jacob by exploiting the Tyrolean mines to such purpose that he lent the Archduke Charles of Austria 150,000 florins and built the castle of Fuggerau. All 3 brothers married women of rank, and were themselves ennobled by Maximilian. For a large loan this monarch mortgaged to the brothers the properties of Kirchberg and Weissenhorn. Jacob (d. 1525) founded in the outskirts of Augsburg the Fuggerei, a settlement of about 50 double dwelling-houses for needy people. Jacob and the sons of Ulrich d. without issue, so that the family property passed to the sons of George. In consideration of the help rendered to him in the early 16th cent. by the 2 brothers, Raimund and Antonius, sons of George F., Charles V gave them the mortgaged properties mentioned above, and created them counts, with princely privileges.

Later, after they had financed his expedition against the Algerian pirates, the king gave them the right to issue their own gold and silver coinage. Notwithstanding their exalted rank they continued their mercantile activities and Antonius (d. 1560) left a fortune of 6,000,000 gold crowns, in addition to other estate in various continents. Raimund (d. 1536)

and Antonius were founders of 2 great lines which were continued to modern times. The fortunes of the F. family are some indication of the prosperity of Germany before the country was devastated by the Thirty Years War. See R. Ehrenburg, *Capital and Finance in the Age of the Renaissance: a Study of the Fuggers and their Connexions*, trans. 1928. See also Eng. trans. of 2 selections from the *Fugger Newsletter*, 1923 and 1928.

Fugitive Offenders Act, 1881. A person who has committed a crime in the Brit. Isles, and who, to avoid arrest, has taken

alleged to have committed the offence (*locus delicti commissi*). When at the *locus delicti* the accused is entitled to a trial within 6 months, and if not tried within that period, or if acquitted, he is entitled to be paid his passage money back either to the place of arrest or his intended destination at the time of arrest. In any case, if not sent back for trial within 1 month of committal he is entitled to be discharged. The magisterial hearing of a case under this Act must be at Bow Street police court, and in Scotland before the sheriff of Edinburgh. By an



German State Railways, Tourist Dept.

THE FUGGEREI, AUGSBURG
Sixteenth century

refuge in some other part of the Brit. Empire, may be arrested and brought back under the F. O. A., 1881, either (a) upon a warrant duly endorsed by the colonial governor, or by a judge of the supreme court in the colony to which the offender has fled; or (b) upon a provisional warrant issued by a colonial magistrate upon such evidence and in such circumstances as would justify such a warrant if the offence had been committed within such magistrate's jurisdiction. These provisions extend also to countries to which the Foreign Jurisdiction Acts (q.v.) apply, but where the offender has escaped to any other foreign country he can only be got back under the terms of an extradition treaty. If the magistrate before whom the fugitive is brought thinks there is *prima facie* evidence of guilt, he may commit or send the accused back for trial to the country or place where he is

Act of 1915 persons wanted in the Brit. Isles for treason and other crimes may be arrested in any of the colonies and protectorates, and vice versa. See Earl of Birkenhead, *International Law*, 6th ed., 1927.

Fugitive Slave Laws. In the U.S.A., before the constitution, there were no F. S. L., it being left to the comity (q.v.) of the states or colonies to surrender slaves who had escaped from service. In 1787 the slave-holding states inserted provisions in their constitutions regulating the surrender of fugitive slaves, and these provisions later found expression in the federal constitution. In 1850 Congress strengthened the provisions by regulating the mode of arrest, trial, and surrender of fugitive slaves. This Act was repealed in 1864. The amended constitution prohibited the slave trade altogether. In England, when serfdom existed, a seri

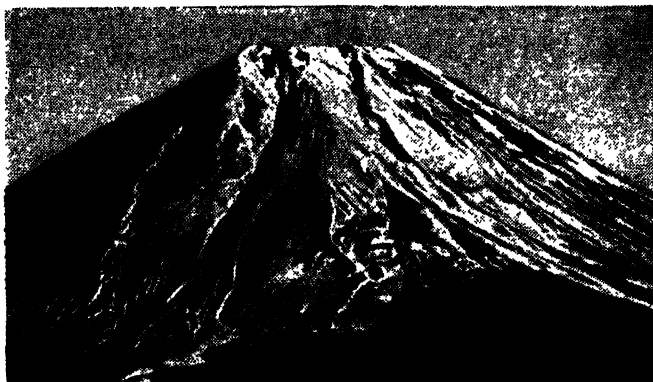
who evaded recapture for a year and a day obtained his freedom, and an Eng. serf could purchase his freedom. No analogous provisions are to be found in the old Amer. F. S. L.

Fugue, highest form of contrapuntal art, and the aesthetic and technical climax of the possibilities of polyphonic music. A F. commences with the statement of a subject by one part followed by the restatement, or answer, by a second part in another position in the scale, usually the dominant, during which the first proceeds with a counter-subject, the third and succeeding parts (if any) being introduced in the same manner. When all the parts have been brought in the

Shantung, China. Pongee, straw platt, and beans are produced. Pop. 215,689.

Fuhshien, tn of Manchuria in the prov. of Liaoning on the E. shore of the Gulf of Liaotung, S. by W. of Newchwang (Yingkow). Pop. 180,000 (1948).

Fujiisan, **Fujiyama**, or **Fuji**, highest mt in Japan, situated between Shizuokaken and Yamanashiken, in the middle of Jap. archipelago, on the Pacific coast. It is a conic volcano, 11,200 ft high, but extinct since 1709. F. has 7 routes leading to the summit, where stands a Shinto shrine, and is worshipped by tens of thousands of people yearly from all over the country. It has long been regarded as the symbol of Japan. The top third is almost always



THE CREST OF FUJISAN

A photograph from H. G. Ponting's *In Lotus Land*

subject is developed at length, its contrapuntal possibilities being fully exploited by means of canon, augmentation, diminution, inversion, etc., and the introduction of episodes. The F. then works up to a climax over a pedal-point, usually the dominant, and the material may be further elaborated by various polyphonic devices, the whole work being brought to a conclusion by way of a *stretto*, where the subject is made to overlap closely in all the parts. Although many 16th-cent. experiments were designated by the title of *fuga*, they were nothing more than canons; it was not until the latter part of the 17th cent. that the true F. was accomplished. The greatest master of F. was J. S. Bach, who not only wrote many fine organ F.s, which have not been surpassed, but also originated the pianoforte F. in *Das wohltemperirte Clavier*, 1722-44; whilst the early 18th-cent. oratorios of Bach and Handel contain some excellent examples of the choral F. See G. Oldroyd, *The Technique and Spirit of Fugue*, 1948.

Fuh-Shan, tn in Fuh-Shan co., E.

covered with snow. Buses now travel to a height of 8000 ft, so that it is possible to climb up and down within 24 hrs from Tokyo. The 5 lakes on the N. skirt are also noted for their scenic beauty.

Fujiwara, see JAPAN, *History*.

Fujiyama, Mount, see FUJISAN.

Fukien, maritime prov. in China, bounded on the SE. by the China Sea, and on the other sides by the provs. of Chekiang, Kiangsi, and Kwangtung. Its area is 48,737 sq. m. The surface is very mountainous, and the prov. is noted for its beauty, the mts. clad with timber and shrubs, forming a picturesque background. The prin. riv. is the Minkiang, which enters the sea below Foochow, the cap., which is celebrated for its fruits, and produces a considerable quantity of ginger. The prov. produces tea, camphor, tobacco, sugar (cultivated in the irrigable country), indigo, and alum, which form its chief exports. The occupation of Taiwan (Formosa) and the F. coastal is. Quaimoy and Matsu by Chiang Kai-Shek's refugee gov. since 1949 has greatly restricted the prov.'s foreign trade; but

the Chinese Gov. has spared no effort in developing it. Two railways (Yint'an-Amoy and Nanping-Foochow; see CHINA) were built in 1956. There is a good timber industry, the chief woods being fir, rosewood, and pine; and paper is manufactured from bamboo pulp. The mineral resources include coal and iron and the precious metals. Clay for the porcelain manufs. of Min ware is also important (see CHINESE ART). The coast people are engaged in trading and fisheries. Pop. 13,142,721 (1954).

Fukui, city noted for its silk industry, and the seat of prefectural gov. of Fukuiken, Japan. An earthquake in June 1948 caused 12,000 casualties, including 1500 dead, in the prefecture. The city, however, was quickly rebuilt, and now has thriving paper and plastic industries, as well as the traditional silk products. Since 1956 a new development-scheme on mechanical industry has been fostered. Pop. 126,000.

Fukuoka, industrial city on the N. coast of Kyushu, Japan, 90 m. NNE. of Nagasaki. The seat of prefectural gov. of Fukuokaken, it is a centre of coal industry, fishery, and forestry. Also famous for its silk, textiles, glassware, and Hakata dolls. Pop. 544,000.

Fukushima, the seat of prefectural gov. of Fukushimaken, Japan, 168 m. N. of Tokyo. Important centre for trade in raw silk and cocoons, as well as textiles of various kinds, pulp and paper, vegetables and fruits. Pop. 127,000.

Fukuyama, city of Hiroshimaken, Japan, 55 m. E. of Hiroshima (q.v.). Noted for production of rush goods and hat-making. Pop. 76,000.

Fulaha, or **Fulani**, important ruling Hamitic-Negro people in Nigeria and Fr. Sudan, founders of the sultanates of Sokoto (q.v.), Gando (q.v.), and others. They are of a light brown or copper colour, of good stature, with Caucasoid features, black hair, and negroid speech. They seem to have migrated westward at an early period, and gradually extended their influence to the E. They number from about 6 to 8 million, and towards the close of last century their sultans were a source of much trouble to Brit. trading interests. The estab. by the National African Company, between 1886 and 1896, of trading stations on the Niger and Benue brought the Brit. into contact with these vigorous Muslim emirates of the N. interior. The Fulani rulers of Kano and Sokoto and the neighbouring ters. represented a century-old wave of Muslim conquest from the Sudan superimposed upon a much older Muslim element dating from the Middle Ages. These Fulani states were strongly administered, warlike, and ruthless in slave-raiding among the pagans and in maintaining the ascendancy of the ruling class by bloodthirsty methods. Although the company had made treaties with them a warlike period began in 1897. Later, in a period of difficult relations here with the Fr. at a time when the Muslim states still remained to be settled with, it was

evident that a trading company was unequal to the responsibilities that would fall upon it, and in 1899 the company's (now Royal Niger Company) charter and governing powers were withdrawn and Col. F. D. Lugard (q.v.) became high commissioner for the newly constituted protectorate of N. Nigeria. His first task was to subdue the N. emirates, whose sultans would not give up slave-trading without a struggle. Already the company had had some fighting with the sultan of Sokoto, but the result was inconclusive. In 1902-3 Lugard overcame the Fulani rulers, and brought their ter. within the area to be ruled by their Brit. suzerain. See S. J. Hogben, *The Emirates of Northern Nigeria*, 1930; F. W. de St Croix, *The Fulani of Northern Nigeria*, 1944; and M. Perham, *Lugard*, 1958.

Fulurum, see LEVER.

Fulda, Ludwig (1862-1939), Ger. poet and dramatist, b. Frankfurt. His one-act verse comedy, *Die Aufrehtigen*, gained him a prize in a competition in 1882, and his dramatic career may be said to have begun with his tragedy, *Christian Günther*, the same year. This was followed by a series of comedies, including *Ein Meteor* and *Die wilde Jagd*, and some dramas, amongst which are *Das verlorene Paradies* and *Die Zwillingsschwester*, 1901. In 1893 he won the Schiller prize with his dramatic fairy tale, *Der Tulieman*, 1893. His trans. of Molière, under the title of *Meisterwerke*, are masterly. He also trans. Rostand, Ibsen, and Sp. comedies. His later works included *Herr und Diener*, 1910, *Die Rückkehr zur Natur*, 1914, and *Des Esels Schatten*, 1920. See monograph by A. Klaar, 1922.

Fulda, Ger. tn in the *Land of Hessen* (q.v.), on the F. R., 72 m. NE. by E. of Wiesbaden (q.v.). It grew up around a Benedictine abbey founded by St Boniface (q.v.) in the 8th cent. In the 9th and 10th cents. the abbey school, estab. by Rabanus Magnentius (q.v.), was famous. In 1020 the tn was the scene of a meeting between the Emperor Henry II (q.v.) and Pope Benedict VIII and in 1157 it was made a city. The abbots of F. were made prince-bishops in 1752. The baroque cathedral contains the tomb of St Boniface; and there are sev. other notable churches, including 2 which date from the 9th cent. The Abbots' Palace (now the tn hall) and the Orangery are both 18th-cent. baroque buildings. There are textile, chemical, and tanning industries. Pop. 47,000.

Fulgentius, St (468-533), one of the fathers of the Church (q.v.), was made bishop of Ruspe in N. Africa, 507 or 508, evidently against his will. For his *Disputation* with Thrasimund, king of the Vandals (496-523), he was banished 510-23, but was restored 523-32. He then retired to a monastery on the is. of Circe. His Lat. treatises against the Arians and Pelagians were ed. by Hunter, Innsbruck, 1884. See also Migne, *Patrologia Latina*, vol. lxx; H. Leclercq, *L'Afrique Chrétienne*, 1904; O. Bardenhewer, *Leo Pères de l'Eglise*, 1905.

Fulgentius, the monk, *see* GOTTSCHALK.
Fulgentius, Fabius Planciades (c. 480–550), Lat. writer and grammarian of N. Africa, probably related to St F. (q.v.), with whom he must not be confounded. The inflated style of his writing affords strong indications of African origin. Four works, which bear evident marks of the same hand, are ascribed to him, and all represent the late African style. The *Liber Physiologus* and others are lost. The 4 extant works are *Mythologiarum Libri III ad Catum Presbyterium* (the identity of Catus is unknown)—a collection of 75 myths connected with the hist. and exploits of gods and heroes, but marred by extravagance and unsound Gk etymology; *Expositio sermonum antiquorum cum testimoniis ad Chalcidicum*—a glossary of obsolete words and phrases, but unreliable, it is often printed with or appended to the *De compendiosa doctrina* of Nonius Marcellus; *Liber de expositione Virgilianae continentiae ad Chalcidicum grammaticum*—a title which means an explanation of the *Aenid* as a picture of human life or of the esoteric truths allegorically conveyed in Virgil's poems; and *De actibus mundi et hominis*. *See* R. Helen (ed.), *Fulgentii Opera*, 1898; H. Liebeschütz, *Fulgentius Metaphorals* (on his influence upon medieval mythology), 1926.

Fulgina, *see* FOLIGNO.

Fulgurites (Lat. *fulgur*, lightning), in petrology, the name given to rocks whose surface has been fused by lightning, and to the characteristic holes thus formed. Examples of the kind have been found on Ararat, in the Alps, Pyrenees, and elsewhere, the surface showing in parts a thin, glassy crust or film, like a coat of varnish. Another kind of F. (vertical sand-tubes, sometimes half an in. in diameter) is found in dry sands, as on the sand-hills of S. America and N. Africa. They often run downwards in the sand for sev. ft, branching off and gradually lessening in their course. The glassy material is seen under the microscope to contain grains of sand and many small cavities. Minerals like mica and felspar are fused more easily than quartz, but sometimes silica abounds in F. glasses.

Fulham, metropolitan bor. of London, on the N. bank of the Thames, and W. of Chelsea. Four old vils. and hamlets are comprised in the bor. The manor of F. belonged to the bishops of London from c. 691 until 1868, and they have been in continuous residence in F. Palace since 1141. The oldest portion of the present palace, however, is the fine courtyard built by Bishop Fitzjames, c. 1510–20; the rest of the buildings are mainly early 19th cent. From the mid 17th to the mid 18th cents. F. supplied London with vegetables. Pottery has been carried on since c. 1670. F. and the adjoining bor. of Hammersmith return 3 members to Parliament, 1 each for the constituencies of F. and Hammersmith, and 1 for the newly created bor. constituency of Baron's Court, which is comprised of 3 wards of F. and 4 of Hammersmith. Area 1706

ac.; pop. 120,700. *See also* HURLINGHAM PARK.

Fuliang, *see* CHINGTEHCHEN.

Fulisa, *see* COOT.

Fuligno, *see* FOLIGNO.

Fuller, George (1822–84), Amer. artist, noted as a portrait painter. He studied under H. K. Brown, the sculptor, in Albany (1842–3), exhibiting a portrait of him in 1857, and becoming associate of New York National Academy. He was dreamy and poetic in style, characteristic works being 'Turkey Pasture in Kentucky,' 1878, 'The Romany Girl,' 1879, 'And she was a Witch,' 1879, and 'Winifred Dysart,' 1881. *See* van Rensselaer, *Six Portraits*, 1889.

Fuller, John Frederick Charles (1878–), Brit. soldier who achieved fame in connection with the development of tanks. Major-general, 1930. Campaigns: South African war, 1899–1902, and First World War. It was mainly through his energetic advocacy and the part he played in the use of tanks in the First World War that the weapon became a success not long after it was first used at the battle of Cambrai (q.v.). His work, *Tanks in the Great War, 1914–18*, 1920, reveals the grip he had on the potentialities of this war machine. He held staff appointments continuously from 1907 until he retired in 1933. When it was decided to introduce mechanised brigades he was appointed military assistant to the chief of the imperial general staff in 1926. He has written numerous works of military science, including *British Light Infantry in the Eighteenth Century*, 1925, *Sir John Moore's System of Training*, 1925, *Foundations of the Science of War*, 1926, *The Generalship of Ulysses Grant*, 1929, *War and Western Civilisation, 1832–1932*, 1932, *Empire Unity and Defence*, 1934, *The Army in my Time*, 1935, *Towards Armageddon*, 1937, *Armaments and History*, 1946, *The Second World War, 1939–45*, 1948, *Decisive Battles of the Western World*, 1954–6.

Fuller, Sarah Margaret (1810–50), Amer. critic and essayist, b. Cambridgeport, Massachusetts. She was educ. by her father, a stern and unbending taskmaster. In 1839 she issued a trans. of the *Conversations of Goethe with Eckermann*. She became a member of the Transcendental Club, and on the foundation of the *Dial* (q.v.), the literary organ of the club, she accepted the editorship, with George Ripley as assistant editor. This was in July 1840, and for 2 years S. F. struggled to keep the paper alive in the face of financial stress. In 1844 she pub. her first book, *Summer on the Lakes*, and in 1845 *Woman in the Nineteenth Century*. In the same year she joined the staff of the New York *Tribune* as literary critic, under Horace Greeley, and in 1846 her contributions to the paper were reprinted as *Papers on Literature and Art*. In the next year she went to reside in Italy, and in Rome she met her husband, Giovanni Angelo, Marquis Ossoli, an adherent of Mazzini. During the siege of Rome in 1849 by the Fr. she took

charge of a hospital. After the capitulation of the city and the total loss of her husband's property she decided to return to America, but perished on the way in a shipwreck. Her *Autobiography*, with memoirs by Emerson, Channing, and Clark, was pub. posthumously in 1852, and sev. lives have been written, notably those of Julia Ward Howe, 1883; T. W. Higginson, 1884; K. Anthony, 1922; M. Wade, 1940; and M. B. Stern, 1942.

Fuller, Thomas (1608-61), Eng. author and clergyman, *b.* Aldwinkle in Northants, his father being rector of the par. He went to Queens' College, Cambridge, where he graduated in 1628, and 2 years later was appointed to the curacy of St Benet's. He became rector of Broadwindsor, Dorsetshire, in 1634, but gave



THOMAS FULLER

up his living in 1641, and settled in London, taking a curacy at the Savoy church in the Strand. His *History of the Holy War* had appeared in 1639, and on coming to London he pub. the *Holy and Profane State*, 1642, his most characteristic work. He was a chaplain in the royal army during the Civil war, and a strong adherent of the royal cause; and during this time wrote, for the encouragement of his men, *Good Thoughts in Bad Times*, 1645, and a sequel, *Good Thoughts in Worse Times*, 1647. At the Restoration he was appointed chaplain extraordinary to the king. One of F.'s characteristics is his quaint humour, though his wit is never forced, and, like Hood, he plays upon words instinctively. His writings are remarkable for wisdom and imagination, as well as pathos, when occasion demands. Amongst his numerous works, besides those already referred to, may be mentioned: *A Pisgah-sight of Palestine and the Confinies Thereof*, 1650, with maps and views, a geographical account of the Holy Land; *The Church History of Britain from the Birth of Christ until the Year 1643*, 1655; *Mix'd Contemplations in Better Times*, 1660; and

The Worthies of England (pub. posthumously, 1662), his best-known work, which is full of interesting biographical and antiquarian matter. See E. K. Broadus (ed.), *Thomas Fuller: Selections with Essays by Charles Lamb, Leslie Stephen*, etc., 1929; and lives by A. T. Russell, 1844; J. E. Bailey, 1874; M. Fuller, 1884; and D. B. Lyman, 1935.

Fuller's Earth (A.-S. *fultere*, from Lat. *fullo*, fuller), pulverulent material resembling clay in appearance, fine-grained and of a variable colour, without plasticity, formerly much used for fulling cloth and wool, that is, cleansing these materials of oil and grease, from whence it derives its name. Nowadays it is more generally employed for clarifying cottonseed and lubricating oil, as a filtering material, absorbing their impurities. F. E. was at one time only mined in England, chiefly at Nutfield, near Reigate, Surrey, and also at Woburn and near Bath, and was considered of great value, its exportation being prohibited. Deposits are now being mined in various localities in the U.S.A., chiefly in Florida. See *Mineral Resources of the United States*, issued by the U.S.A. Geological Survey (Washington, annually). Cimolite is a variety of F. E.

Fullerton, Lady Georgiana Charlotte (1812-85), novelist, *b.* Tixall Hall, Staffordshire, daughter of Lord Granville Leveson-Gower. She spent much of her early life in Paris, where in 1833 she married Alexander George F. Her earlier works include *Ellen Middleton*, 1844, and *Grantley Manor*, 1847. In 1846 she entered the Rom. Catholic Church and later wrote controversial novels on Catholic subjects, including *Lady Bird*, 1852, and *Constance Sherwood*, 1855. See lives by A. Craven (trans. from the Fr. by H. J. Coleridge), 1888; C. M. Yonge, 1897; and F. M. Taylor, *The Inner Life of Lady Georgiana Fullerton, with Notes of Retreat and Diary*, 1899.

Fulleylove, John (1847-1908), landscape painter, *b.* Leicester. He early showed a taste for architectural drawing, and exhibited from 1871, mainly water-colours resulting from his travels in Britain, Italy, Greece, and Palestine. He produced 2 series of drawings of the Oxford and Cambridge colleges and churches. F. became a member of the Royal Watercolour Society, 1879.

Fulmar, see PETREL.

Fulminates, class of salts derived from fulminic acid, C:N·OH; they are isomeric with cyanates, but explode violently when struck or heated. The 2 chief are fulminating mercury and silver. The first is obtained by heating mercury with alcohol and nitric acid. The white, silky crystals are used in manufacturing percussion caps. Brugnatelli's fulminating silver was first obtained in 1798, a year before Howard's mercury, which merely substituted mercury for silver in the heating process. The white needles are bitter and poisonous. F. of sev. other metals are known.

Fulminic Acid (C:N·OH), an organic acid isomeric with cyanic acid. Its salts

or 'fulminates' are very explosive and used as detonators. The free acid is also very explosive, and the vapour poisonous like that of prussic acid. It and its salts are interesting inasmuch as they contain a bivalent C. atom, the normal valency of C. being 4.

Fulton, Robert (1765-1815), Amer. mechanician and engineer of Irish parentage. From 1786 he studied under West in England, taking out patents for sev. inventions. F. was in Paris, 1797-1804, and devoted considerable attention to steam navigation. By 1803 he had constructed a small steamboat which navigated the Seine. His inventions included flax-spinning and dredging machines, and a submarine or torpedo (Nautilus, 1801). Disappointed by his reception in France and England, F. returned to America, and was employed by the gov. in making canals. In 1807, with Livingston, he perfected the discovery of steam navigation, and launched the *Clermont*, which went from New York to Albany (150 m.) in 32 hrs. Speed was soon considerably increased. F. pub. *Treatise on the Improvement of Canal Navigation*, 1796, and *Torpedo War*, 1810. See also SHIPS and SHIPBUILDING. See lives by C. D. Colden, 1817, and C. Montgomery, 1825; and R. H. Thurston, *History of the Growth of the Steam-engine*, 1878; T. W. Knox, *Fulton and Steam Navigation*, 1893; Mrs A. C. Sutcliffe, *R. Fulton and the 'Clermont'*, 1909; and H. W. Dickinson, *R. Fulton: Engineer and Artist*, 1913.

Fulton, city, cap. of Callaway co., Missouri, U.S.A., in agric. and coal-mining area 25 m. N.E. of Jefferson City. It manufs. flour and fire-clay products and is the seat of the Missouri School for the Deaf and of Westminster College. Here Prime Minister Churchill delivered in 1946 a famous speech advocating an Anglo-Amer. 'fraternal association.' Pop. 10,100.

Fulvia (d. 40 bc), Rom. lady noted for her ambitious intrigues. Her first husband was Clodius; her third, Mark Antony (44 bc). She had considerable power in Rome during the civil war that followed Caesar's murder, and showed a vindictive spirit in the proscriptions. She instigated an unsuccessful revolt against Octavian during his absence in the E. Besieged in Perusia, she managed to escape to Athens, but was coldly received by Antony, and d. soon afterwards at Sicyon. See Cicero, *Philippics*, ii. **Fulvio**, see HUMUS.

Fum, Fung-hwang, or Fung-hwang, a fabulous Chinese bird of good omen, one of the 4 symbolical creatures guarding the celestial empire, whose appearance heralded an age of universal virtue and prosperity. Sometimes called the Chinese phoenix, it is a grotesque mixture of many birds and beasts, with a fish's tail. It perches only on the woo-tung tree, and figures on porcelains or the embroidered robes of mandarins.

Fumaric Acid, acid geometrically isomeric with maleic acid, and possessing

the formula $\text{HOOC}\cdot\text{CH}:\text{CH}\cdot\text{COOH}$. It occurs in various fungi, in the fumitory (*Fumaria officinalis*), and in Iceland moss. It may be prepared by heating maleic acid alone to 150°C ., or by heating it with hydrochloric acid or hydrobromic acid, and by boiling monobromosuccinic acid with water ($\text{HOOC}\cdot\text{CHBr}\cdot\text{CH}_2\cdot\text{COOH} = \text{HOOC}\cdot\text{CH}:\text{CH}\cdot\text{COOH} + \text{HBr}$). F. A. is a white crystalline solid, which when heated yields maleic anhydride and water. See also MALEIC ACID.

Fumarole, small volcanic vent from which steam and other volcanic gases emerge. F.s occur in areas where vulcanicity is quiescent or declining and may provide exploitable sources of substances such as sulphur and borax.

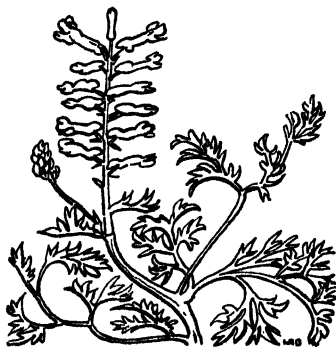
Fumay, Fr. tn in the dept of Ardennes, in the valley of the Meuse amid wooded heights. It has slate quarries and engineering works. Pop. 4000.

Fume Precipitation. Electrostatic (Lodge-Cottrell). The first successful installation was in connection with the removal of sulphuric acid from smelter gases. The gas to be treated passes through an intense electric field between a central electrode at high potential and the walls of earthed plates or tubes. The distance between the electrodes varies from 2 to 6 in., while the voltage may be between 30 and 100 kV., and is regulated to give as strong a glow discharge as possible without disruptive discharge. On passing through the field, the particles of dust or fume become charged, and are deposited on the larger electrode surfaces. If liquid, the particles coalesce and flow away; if solid, a tapping device dislodges the dust which collects at the base of the apparatus. The h.v. direct current for charging the central electrode is obtained from a rectifier (q.v.) supplied from a step-up transformer. The method removes sulphur trioxide from gases by the formation of sulphuric acid mist, so that moisture content and temp. are important considerations. According to Howard (*Trans. A.I.M.E.*, 49, p. 540), for the removal of sulphur trioxide and dust from copper furnace fumes a gas velocity of less than 15 ft/s., a temp. of 90°C ., and a water content of 4 per cent by weight of the dust collected give the best results. The process has also been applied successfully to metallic and acid fumes, to the dust from cement kilns, and to smoke and dust from power plants and the removal of tar from carbonisation gases. The efficiency is generally over 99 per cent.

Fumigation (from Lat. *fumigare*, to smoke), operation of burning, or volatilising, substances in order to produce vapours calculated to destroy disease germs, vermin, etc. The use of F. as a disinfecting process is now practically restricted to steam and hot-air disinfection. Other measures, such as the burning of resins, camphor, etc., have little or no effect on micro-organisms, and preserve their popularity by virtue of the powerful odours which effectually disguise any smell of putrefaction. F. for the destruction of vermin is effectively carried

out in the case of house vermin by burning sulphur. The paper should be stripped from the walls, the room made as air-tight as possible before the sulphur is lighted, and the fumes should then be left for some time to penetrate into every corner and crevice. A favourite manner of ridding the garden of insect pests was to fumigate with tobacco smoke. This was done by enclosing some strong tobacco mixed with organic refuse in a wire cage, getting it well alight by swinging the cage in the air, and then leaving it to smoulder in close proximity to the plants to be treated.

Fumitory, popular name given to species of *Fumaria*, a genus of about 20 species, chiefly ann. herbs.



FUMITORY

Funchal: 1. Dist. of Portugal, co extensive with the Madeira Is. (see MADEIRA). Area 302 sq. m.; pop. 267,000.

2. Portuguese city, cap. of F. dist., on the S.E. coast of Madeira Is. It was founded in 1421 by João Gonçalves Zarco. It was sacked by the Fr. in 1586, was in Sp. hands 1580-1640, and was occupied by the Eng. during the Napoleonic wars. The city is beautifully situated on hill slopes, and has a 15th-cent. cathedral and an old fort. The harbour takes ocean-going vessels. There are sugar, tobacco, and distilling industries; and wine, embroidery, and wickerwork are exported. Pop. 37,215.

Function: 1. In mathematics a number whose value is dependent on the value of another number or other numbers. Any symbol which may take on one of a class of values, and is not restricted to a single value, is called a variable. A casual labourer's yearly income, which may fluctuate within certain fairly definite limits, is, therefore, a variable quantity. If it fluctuates simply because he cannot work on wet days, its value depends on the number of wet days in the year; the labourer's income may then be said to be a F. of the number of wet days

in the year. If it depends on other causes also, such as the general prosperity of the dist., his personal health, etc., it may be stated as a F. of many variables. In algebraical language, the variable y is called a F. of the variable x if to every value of x there corresponds one or more values of y . Such quantities as ax , $ax+b$, x^2 , $\sin x$, $\log x$, etc., are all F.s of x . When a quantity involves the first power of x only, as in $ax+b$, it is said to be a linear F., or F. of the first degree; when it involves the second power of x and no higher power, as in ax^2+bx+c , it is said to be a quadratic F., or F. of the second degree; when it involves the third power of x and no higher power, as in ax^3+bx^2+cx+d , it is said to be a cubic F., or F. of the third degree; in general, a F. of the form $a_nx^n+a_{n-1}x^{n-1}+a_{n-2}x^{n-2}+\dots+a_{n-1}x+a_n$ is said to be a F. of the n th degree. F.s are indicated by various signs, such as f, F, ϕ, ψ , etc. Thus $y, f(x)$, etc., is a F. of x ; the relation is shown by the equation $y = f(x)$. Where there are two or more variables, the relation is indicated as in $y = f(x, r)$ and $y = f(x, r, s)$. The variable on which the value depends is called the independent variable, that whose value depends on the independent variable is called the dependent variable; thus in the relation $y = f(x)$, x is the independent, and y the dependent, variable. A F. is said to be homogeneous when all its terms are of the same degree. A rational and integral F. is one where the indices of the variable are positive integers and the coefficients do not involve the variable, as in the form $a_nx^n+a_{n-1}x^{n-1}+a_{n-2}x^{n-2}+\dots+a_{n-1}x+a_n$. A symmetrical function is one in which any two variables may be interchanged without altering the value of the F. Thus $x^3+y^3+z^3-xyz$ is a symmetrical F. An alternating or skew symmetrical function is one where, if two variables are interchanged, the F. is altered in sign but not in value. Thus $a^2(b-c)+b^2(c-a)+c^2(a-b)$ is an alternating F.

Derived functions may be obtained in this way. Let $f(x) = a_0x^n+a_1x^{n-1}+a_2x^{n-2}+\dots+a_{n-1}x+a_n$. Then $f(x+h) = a_0(x+h)^n+a_1(x+h)^{n-1}+\dots+a_{n-1}(x+h)+a_n$. Expanding, we get $a_0x^n+a_1x^{n-1}+\dots+a_{n-1}x+a_n+h[na_0x^{n-1}+(n-1)a_1x^{n-2}+\dots+(n-1)a_{n-1}] + \frac{h^2}{2}[n(n-1)a_0x^{n-2}+(n-1)(n-2)a_1x^{n-3}+\dots+2a_{n-2}] + \dots + \frac{h^n}{n!}[n(n-1)(n-2)\dots 2.1a_0]$. This result is written more concisely as $f(x+h) = f(x) + hf'(x) + \frac{h^2}{2}f''(x) + \dots + \frac{h^n}{n!}f^{(n)}(x)$ and the terms $f'(x), f''(x), \dots, f^{(n)}(x)$ are known as the first, second, ... and n th derived F.s of $f(x)$. This expansion is called Taylor's Theorem, having been first pub. in 1715 by Dr Brook Taylor.

Limiting values.—In the equation $y = f(x)$, if, as the independent variable approaches a value a , the F. $f(x)$ can be made to differ by as little as we please from a fixed quantity b , then b is called the limit of y , when $x = a$. Consider the

series $1 + \frac{1}{2^n} + \frac{1}{2^{2n}} + \dots$. The sum $= \frac{1 - (\frac{1}{2})^n}{1 - \frac{1}{2}}$
 $= 2 - \frac{1}{2^{n-1}}$ and is therefore a F. of n ; that

is, $S = f(n)$. But $\frac{1}{2^{n-1}}$ can be made as small as we please by increasing the value of n ; that is, the value of S can be made to differ from 2 by as little as we please. This is expressed by saying that the limit of S is 2 when n is infinite.

F.s may be either *algebraical* or *transcendental*. An algebraical F. is one which may be expressed in a finite number of terms, and involves no other processes than those of addition, subtraction, multiplication, division and root-extraction. All other F.s are called transcendental, and include such F.s as $\log x$, $\sin x$, $\cos x$, etc.

A F. is said to be *continuous* when an infinitely small change in the independent variable is accompanied by a correspondingly small change in the dependent variable. A F. is said to be *discontinuous* when an infinitely small change in the independent variable is accompanied by a great change in the dependent variable.

Periodic functions are those whose values recur regularly to certain limits, passing through all the values between those limits, while the independent variable increases or decreases in value by a certain definite amount called the period. To quote an example from trigonometry, $\sin A$ is a F. of A ; as A increases from 0° to 90° , $\sin A$ increases from 0 to 1; as A increases from 90° to 180° , $\sin A$ decreases from 1 to 0; as A increases from 180° to 270° , $\sin A$ decreases from 0 to -1; as A increases from 270° to 360° , $\sin A$ increases from -1 to 0; as A increases from 360° to 450° , $\sin A$ increases from 0 to 1, and so on. It is now seen that the limits of the values of the F. $\sin A$ are -1 and 1, and that the values fluctuate between these limits as the angle increases. The value of $\sin A$ is 1 when $A = 90^\circ$ or 450° or $810^\circ \dots$. The period in this case is therefore 360° , and any values of the independent variable which have a difference of 360° give the same value for the dependent variable. This is expressed by stating that $f(x + \frac{1}{2}a) = f(x - \frac{1}{2}a)$ for all values of x , a being the period. The importance of periodic F.s is best demonstrated by their use in connection with the theory of sound vibrations. Any periodic disturbance in air may be resolved into a series of sine curves (see SINE, CURVE OF). Fourier's theorem states that a single-valued periodic F. may be expressed as a convergent series, thus:

$$\frac{1}{2}A_0 + \sum A_n \cos 2n\pi x \\ + \sum B_n$$

where a is the period and n has values from 1 to infinity.

Elliptic functions are usually defined with reference to elliptic integrals, so-called because certain types are expressed

by the arc of an ellipse. The development of these F.s is owing in a great degree to the labours of A. M. Legendre (1752-1823), who pub. his *Traité des fonctions elliptiques* in 1827. His work was supplemented and to an extent revolutionised by N. H. Abel and C. G. Jacobi. A good introductory treatise is provided by A. C. Dixon in his *The Elementary Properties of the Elliptic Functions*, 1894, and by A. T. Baker in *Elliptic Functions*, 1915. See also J. Wright, *Theory of the Functions of Complex Variables*, 1918; E. Hobson, *Theory of Spherical and Ellipsoidal Harmonics*, 1931; and E. C. Titchmarsh, *Theory of Functions*, 1932.

2. In physiology, the special activity of a cell, tissue, or organ. In organisms which comprise but a single acellular unit, all the various types of activity necessary for the maintenance of the living state are undertaken by the cell as a whole; the amoeba, for example, performs the processes of engulfing its food, digesting it, excreting waste material, and building up the nutrient matter into its own substance by chemical and physical actions in which all parts of the cell seem to join. Multicellular organisms, on the other hand, possess cells which are differentiated for special activities, and their form is determined by the work they are called upon to do. Again, certain cells take on a measure of continuity with each other to form tissues which are again differentiated according to the work they have to perform. Thus we have connective tissues, including the varieties: osseous tissue, cartilaginous tissue, fibrous tissue, adipose tissue, nervous tissue, epithelial tissue, etc. These tissues enter into the structure of organs with special activities; thus we say the F. of the stomach is to digest, that of the kidney to excrete waste liquid products, and so on.

Functionalism, see ARCHITECTURE, 9.
Fundamental Education, system of education designed to raise the standards of living of the pop. generally. It is particularly applicable to agric. and rural areas where mechanisation is virtually unknown. Through it an attack on illiteracy (q.v.) is made. But as many speakers argued at the immediate post-war meetings of UNESCO, literacy is no guarantee of effective participation in economic and political affairs. The feeling was strongly held that education could and should do more than promote literacy—it should help to promote democratic ways of living, and form the basis of permanent peace, security, and social justice for people all over the world. In pursuance of these aims UNESCO and other agencies have initiated pilot projects, designed in the first instance as experiments from which information about the theoretical and practical problems associated with this kind of education could be acquired. UNESCO has estab. 2 international training centres for teachers and workers in F. E. They are at Patzcuaro, Mexico, and Sirs-al-Layyan, Egypt. According to UNESCO, F. E. is the minimum of general education

which helps children and adults to understand the problems of their immediate environment, their rights and duties as individuals, and to participate more effectively in the economic and social progress of their community. It is 'general' in the sense that the knowledge is not imparted for its own sake but as a means of raising standards of living, and developing social and individual living. It is concerned with children and adults who have received no primary school education.

Education, therefore, is centred round social and economic activities rather than books. The principles behind it are not new. John Dewey at the start of the century gave great impetus to the idea of 'learning through doing.' Gandhi, in his Wardha scheme, suggested that education should be based on craft work, that is on the cottage industries that abound in India. The theory is that through this craft work not only could the children become productive, selling their products to help maintain the school, but the creative and intellectual sides of personal growth would be encouraged. In modified form this scheme has been accepted by the Indian Gov. as suitable for their primary schools. The plan is called Basic Education (see MASS EDUCATION). It does, however, require for its implementation a corps of well and specially trained teachers, adequate buildings, and well equipped workshops. Furthermore it has to meet the challenge created by the fact that India is moving slowly but inevitably away from agriculture to industry. A new base might have to be found to provide education through the fundamental occupational skills. These and many community development schemes are operating throughout the world. See UNESCO, *Fundamental and Adult Education* (quarterly); *Studies in Compulsory Education* for various countries; *Fundamental Education*, 1947; monographs on Fundamental Education (various titles).

Fundamentalism is in its essence the opposition of orthodox churchmen to the teaching of modern science where the latter comes into conflict with the Bible story. F. came into nation-wide notice in the U.S.A. in 1925 when a young schoolmaster, John T. Scopes, a teacher in the high school at Dayton, Tennessee, was arraigned in court for violating the state law, which forbade the teaching of evolution in state schools. The immediate issue was a violation of a state law. But its wider implications involved the question whether a state, through its legislature, could restrict scientific teaching when it conflicted with religious beliefs. Bryan, one of the prosecutors, argued for the literal truth of every word and every sentence of the Bible. He objected to the theory of evolution because it ran counter to the Bible story of creation. Scopes was fined 100 dollars. Later the Supreme Court reversed the decision, on a technical point of law. Mississippi afterwards passed a similar law, and the

Fundamentalists attempted to bring this about in some 7 or 8 other states, but their measures were killed by ridicule. See H. E. Fosdick, *The Modern Use of the Bible* (against F.), 1924; J. C. Machen, *What is Faith?* (for F.), 1925; M. Shipley, *The War on Modern Science*, 1927; S. G. Cole, *History of Fundamentalism*, 1931.

Fundanus, Laous, see FONDI.

Funded Debt was the term originally used for a D. the service (administration and payment of interest) of which was secured upon some specified fund. But the term is now used without special application to any fund in respect of any large public loan raised for permanent purposes, bearing a certain rate of interest. When the loan is raised a date of repayment may or may not be quoted. The F. D. of the U.K. belongs to the latter category, but the gov. reserves to itself the right to redeem after a fixed period. Goschen's consols, a case in point, were made redeemable after 1923. The practice in general use in the U.K. for the reduction of D. is that of a sinking fund from which contributions should be made annually by the chancellor of the exchequer. This practice is open to the objection that in the hands of a chancellor who is not too squeamish the sinking fund is open to inroads which may help him to tide over his difficulties for the time, but unfortunately do not help in the reduction of the national D. Another practice adopted is that of conversion, by which means loans issued at certain rates of interest are converted into issues bearing a lower rate. To reduce their F. D.s other nations sometimes make yearly purchases by drawings, the money being supplied by a sinking fund. See also PUBLIC DEBT.

Fundi, see FONDI.

Funds, see PUBLIC DEBT.

Fundy, Bay of (Fr. *fond de la baie*, head of the bay), arm of the Atlantic Ocean separating Nova Scotia from New Brunswick and the state of Maine, extending 180 m. in length. It is exceedingly difficult to navigate, owing to the tides, which at certain seasons have a rise and fall of 53 ft, producing dangerous bores in the upper reaches. At low tide the shores have the appearance of long stretches of mud-flats.

Fünen, Denmark, see FYN.

Funeral Expenses, in law, are a privileged debt allowed before all other charges, both in England and in Scotland, if limited to the estate left by deceased.

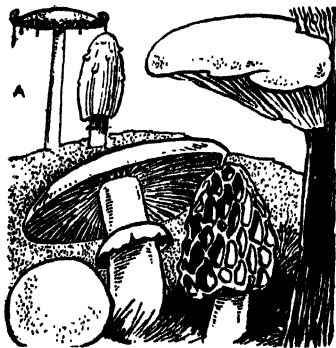
Funeral Rites, observances connected with death and burial. The care of the dead is a marked feature of religion among all nations. Among the Hindus the corpse is perfumed and adorned with flowers and then burned. The Muslims bury their dead; and, as is well known, the Egyptians always embalmed dead bodies (see MUMMIES). The mourning customs of the Jews may be collected from the Scriptures. In the creed of the Greeks and Romans, sepulture of the dead was an act of piety to prevent the wanderings of the spirit on the shores

of Styx. They burned their dead on funeral pyres and deposited the ashes in an urn. F. R. in ancient times often included games or scenic and gladiatorial shows.

Funeral Societies, see FRIENDLY SOCIETIES.

Funkirchen, see PÉCS.

Fungi, one of the 2 groups of plants of the Thallophyta, the div. of the vegetable kingdom which includes the most lowly organised plants. F. differ from the algae, the other group, in having no chlorophyll; hence they cannot assimilate carbon dioxide, but depend upon living or dead organic matter for food. Many F. are saprophytes, living on dead organic matter, others are parasites, living on live plants or animals; some behave as both.



FUNGI (BASIDIOMYCETES)

A, Ink cap or Shaggy cap (*Coprinus comatus*). Left to right: puff-ball (*Lycoperdon saccharum*); edible mushroom (*Psalliota arvensis*); morel (*Morchella esculenta*); *Agaricus (Pleurotus) orestatus*.

Most plant diseases are caused by F., or their near relations, bacteria. F. vary in form from single-cell, microscopic structures to specialised forms with conspicuous fructifications. In the widest sense, F. are sometimes held to include the Myxothallophyta (slime F.), Myxomycetes (the Mycetozoa of the zoologist), Schizomycetes (bacteria), and Lichenes; but are more closely applied to the Eumycetes, a subdiv. of heterotrophic organisms, comprised of about 37,000 species in over 3500 genera. As such, F. are usually multi-cellular organic units, with a vegetative body composed of fine tubes or threads termed hyphae, which collectively are called the mycelium (commonly known in mushrooms as 'spawn'). The hyphae are woven and intertwined, and when the fructification is formed, they are closely packed to produce a solid mass which becomes the mushroom, toadstool, bracket fungus, or fruit body, of soft, leathery or even woody texture, but always consisting of interwoven hyphae.

F. reproduce by means of spores, simple structures of one or more cells, without embryos, varied in colour, form, and size, and produced in gills or tubes of fruit-bodies. All F. produce asexual spores, and in some there is also a sexual process. F. are divided into 4 classes: (1) Phycomycetes, in which the mycelium is not partitioned or non-septate. This class contains the F. responsible for moulds, such as potato blight, damping-off, tomato leaf-mould, etc. (2) Ascomycetes, with mycelium septate, and producing sexual spores in asci. The class includes mildews, blue-green moulds, Penicillium; and higher forms having cup-shaped fructifications which are brightly coloured (e.g. *Peziza*). (3) Basidiomycetes, with mycelium septate, and sexual spores on basidia; a large class which includes the parasitic F. responsible for Smuts and Rusts; mushrooms, toadstools, and puff-balls. (4) F. Imperfecti, with mycelium septate, and asexual spores. Most F. Imperfecti are imperfect states of Ascomycetes, but may include imperfect states of some Basidiomycetes. Briefly, many F. produce spores by abstricting (cutting-off) tips of hyphae. The spores are known as conidia, and the stage of a fungus producing conidia is the 'imperfect stage.' When the fungus forms a complex fructification which produces other special types of spores, it has reached the 'perfect stage.' F. with 2 such reproductive stages often receive 2 names, but the name for the perfect stage is the correct one. F. are identified by the form and structure of their perfect fructification, and the colour, size, and shape of the spores it produces. See G. Massee, *British Fungi*, 1911; E. W. Swanton, *Fungi and How to know Them*, 1923; M. Grieve, *Fungi as Food and in Medicine*, 1925; H. Gwynne-Vaughan and B. Barnes, *Structure and Development of Fungi*, 1927; J. Ramsbottom, *Handbook of the Larger British Fungi*, 1951; J. Ramsbottom, *Mushrooms and Toadstools*, 1954.

Fungibles. In the classification of property Scots law, following Rom. law, distinguishes between F. and non-F. F. are such things as are estimated by weight, number, or measure and can be replaced by others of equal quality and quantity, e.g. money or grain. The distinction is of importance in the case of a loan when there may be a question of whether the actual subject lent must be returned or merely its equivalent.

Fungicide, a chemical compound chiefly used to prevent or inhibit fungus diseases in plants. A F. may act by killing the fungus parasite, or by preventing the germination of its spores, or both. F.s may be applied in liquid or powder form, and their effectiveness usually depends upon proper coverage of the plant and application at the right time. Older F.s are based chiefly on copper salts or sulphur, but more recently mercury compounds and complex organic chemicals have come to the fore. The more important F.s are:

Bordeaux mixture, a mixture of copper sulphate and lime solutions; *Burgundy mixture*, a mixture of copper sulphate and washing soda solutions; *colloidal copper*; *copper-lime dusts*; *ammoniacal copper carbonate*; *copper oxychloride*; *copper sulphate* (used on dormant plants only); *cuprous oxide*; *Cheshunt compound*; powdered sulphur; *lime-sulphur*; *liver of sulphur*; *ammonium polysulphide*; *mercury compounds*. Organic F.s such as *Caplan*, *Zineb*, *Ziram*, *Thiram*, *Manam*, and *Karathane* are tending to supplant the older F.s in many programmes for disease control. See FUNGI; PARASITES.

Fungus, in medicine. Some members of the F. group of plants are parasitic to man, causing diseased conditions; such are *Achorion schleinii*, causing *favus* (q.v.), *Microsporum audouini* and *Trichophyton tonsurans*, causing ringworm (q.v.), and *Actinomyces bovis*, or ray F., which causes the swelling of the jaw known as actinomycosis (q.v.).

Fungus Melitensis, see CYNOMORIUM.

Funicular Railway, see RAILWAYS, Mountain Railways.

Funk, Isaac Kaufman (1839-1912), Amer. author and publisher, b. Clifton, Ohio, and educ. at Wittenberg College and Wittenberg Theological Seminary. He was ordained a minister of the Lutheran Church, 1861, and after holding various pastorates he started a publishing business, 1876, in which he was joined by A. W. Wagnalls, 1878. The firm operates successfully to-day as Funk and Wagnalls. F. ed. the *Standard Dictionary*, founded the *Metropolitan Pulpit*, now the *Homiletic Review*, 1876, and various other papers, and wrote, among other works, *The Next Step in Evolution*, 1902, and *The Psychic Riddle*, 1907.

Funk, Walther (1890-), Ger. journalist and economist, b. in E. Prussia and educ. at Berlin and Leipzig Univs. He was appointed head of the Reich press bureau in 1933; and in the same year was made Reich minister of propaganda. He became minister of economics, 1938, and in 1939 he took over the Reichsbank when Schacht (q.v.) was dismissed. He was president of the Reichsbank until 1945. F. was tried at Nuremberg (1946) as a war criminal, and sentenced to life imprisonment.

Funkia, see HOSTA.

Funny-bone, popular name for that part of the elbow where the ulnar nerve passes down the inner condyle of the humerus. The nerve being comparatively unprotected, a blow on this point will cause a tingling, pricking sensation down the whole length of the nerve to the ulnar side of the hand, followed by numbness. It has also been termed the crazy-bone.

Fur, term used generally to cover the skins of animals complete with the outer covering of wool and hair; used for the manuf. of coats, ties, and trimmings. F.-bearing animals are found widely distributed throughout the world, but with some exceptions the finest are obtained from the colder regions of the N. hemisphere. The animals should be taken

when the weather is coldest, as then their F. is most fully developed; that is in winter, or early spring in the case of water animals. F.s present a considerable variety of colour, texture, and pattern; after dressing, some are used in a more or less natural state, whilst others are dyed and submitted to various processes before being manufactured into coats.

Fox.—The silver fox occurs in the wild state as a mutant of the red fox, and exhibits colour phases varying from pure black to a complete covering of silver guard hair. Wild silvers are comparatively rare, but the animal has been raised in captivity since 1908, and silver fox ranching is now an extensive industry, particularly in N. America, the



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PLATINA FOX, RAISED IN CAPTIVITY

Scandinavian countries, and Russia. Cross fox occurs in red fox litters, and its distinctive feature is a dark cross on the shoulders. White fox is found mainly in the Arctic circle and Siberia, is pure white in colour with deep, dense F., and is used for making capes, trimmings, etc. Most is dyed, particularly with the light pastel shades. Red fox is found in practically every country N. of the equator. It varies in colour from yellow to dark red, and is often dyed and used extensively for trimmings. Blue fox is found in the Arctic regions of Canada, Alaska, and Greenland, is bluish in colour, and used to make capes and stoles. It is farmed extensively in Scandinavia.

Weasels.—Fisher is the largest species of the weasel family, and has very fine, silky hair, which is a dark brown in colour. This is a highly prized and very valuable F., found only in N. America. Badger is found in the N. Amer. continent, Europe, and Asia. The hair is silvery grey in colour, and those from N. America

are used for trimming, etc., and the European and Asiatic skins for brushes. Ermine is found mainly in Canada and Siberia, and is creamy white in colour, with a black tip to the tail. Marten is a fine and valuable soft, silky F. used for capes, stoles, etc., found mainly in Canada, and varying in colour from yellow to dark brown. It is the Canadian counterpart of Russian sable. Sable is the most costly and prized member of the weasel family, and is found in most parts of Russia. It has the same characteristics as the Canadian marten, but is smaller, with better colour and quality of F. Skunk is found in N. and S. America, and is black in colour. Many have white stripes, which are cut out or dyed before the F. is used.

Rodents.—Beaver is found mainly in Canada and N. U.S.A. The best types come from E. Canada; they are brown in colour, and are not used in their natural state. The top hair is plucked, and the under F. is sheared to make coats, etc. There are 3 main types of muskrat recognised by the F. trade: (a) Canadian and Amer., which varies from golden to dark brown in colour, and has thick underwool with short top hair, and is used naturally and dyed for coats, etc; (b) black, which is found mainly in E. America; apart from being black in colour its characteristics are as (a); (c) S., which is found in Louisiana and Texas, and is farmed extensively in Russia, has brown underwool and black top hair, otherwise with the same characteristics as (a) and (b). Marmot is found mainly in Mongolia, Russia, and Russian Siberia, and is generally used as a cheap imitation of mink. Nutria is native to S. America, and is an inferior species of the beaver. It is also raised in captivity; the top hair is plucked or sheared, leaving soft brown underwool. Squirrel is found in all parts of the N. hemisphere, but the largest quantities come from Russia and Canada. The finest come from Russia, and are grey-blue, and very well furred. The Canadian type are weaker and of a red-brown hue. They are dyed and manufactured into coats.

Cat.—Leopard is found principally in India and Africa, the best types coming from Somaliland. The hair is short and the best bear a well-defined pattern of black rosettes on a clear yellow background. House cat is found in almost all countries; it is of many different colours, and is used for cheap coats, trimming, etc., after processing. Lynx is found mainly in Canada and Siberia. It is the most beautiful of the cat family, having long, silky F. of a silvery grey colour, and is used for trimming.

Fitch.—This is a species of ferret found in Europe and Asia. The colour varies from dark brown to yellow (found in Europe) and white to pale brown (found in Asia). It is used to make cheap coats, etc.

Mole.—This is a small insect-eating animal with soft, velvety, blue-black F., which is found throughout the N. hemi-

sphere. It wears badly and is not in great demand.

Opossum.—Each country produces a different type, but in the main they have creamy white underwool with darker, somewhat silvery, guard hair. Skins from N. and S. America have sharp guard hair. Australia and New Zealand produce a woolly textured F.

Pony.—The ponies used by the F. trade come mainly from S. America and Russia. They have short, coarse brown hair, the short-haired variety with a moiré pattern being recognised as the finest.

Raccoon.—These are found in America and Canada, are bluish-black tipped and reddish-brown in colour, and have thick, woolly F., used for trimming, coats, etc.

Mink.—The most desirable types of wild mink are found in Canada and N. America. The F. varies in colour from light to dark brown, and is of a dense, even, silky texture. Its prin. use is for manuf. into coats. Mink are also raised in captivity, and the best of the ranch types compare very favourably with the wild types. In recent years a number of varieties have been developed. They are known collectively as mutation mink, of which the most valuable are silver blue, pastel, and white.

Seal.—There are 2 types, which are found in most oceanic regions: (a) F. seal, which is taken mostly in Alaska, Pribilof Is., Lobos, and Cape of Good Hope. S. Africa, where the animal goes to breed. It has coarse, silvery top hair and very soft underwool which, when the top hair has been removed, is dyed and used for coats, etc; (b) hair seal, which is found mainly in the N. hemisphere, and is characterised by its absence of underwool.

Lamb.—There are very many varieties of lamb which are used by the F. trade. The types most commonly used are the Persian and Indian lambs. Persian are indigenous to Bokhara, Afghanistan, and Samarkand, but are now extensively found in S. Africa, whence come most of the skins used commercially. The wool is curled, and the value of a skin depends on the size, lustre, and pattern of the curls. The majority are black, but grey, white, brown, and mottled varieties also occur. Indian lambs are not so fine as Persian, and are mainly white in colour, though some are brown, black, or mottled, the curl being flat and open, and the skins are used for coats, etc.

See H. A. Innis, *Fur Trade in Canada*, 1930; F. Merk, *The Fur Trade*, 1931; F. Moloney, *Fur Trade in New England*, 1931; C. T. Williams, *Modern Fur Farming*, 1934; and B. A. de Voto, *Across the Wide Missouri*, 1948; and *The British Fur Trade Year Book*.

Fur Seal, or Sea Bear, belongs to the Otariidae, or sea-lions, as opposed to the Phocidae or true seals. F. S.s are divided into N. and S. herds, the latter of which are much reduced. But *Otaria ursina* of the N. Pacific, especially of the Commander and Pribylov (or Pribilof) Is. in the Behring Sea, is still comparatively plentiful. These is. were leased by the

U.S.A. to the Alaska Commercial Company (1870-90), and afterwards to the N. Amer. Commercial Company, whose monopoly, however, expired in 1910. The adult bull is 6 ft long, with a girth of 4 ft. In its seventh year it weighs about 450 lb. Its fur is dark brown, but that of the female, which is much smaller and weighs only 80 lb., is often fairly light. Seals feed in deep water chiefly on a small fish rather like smelt, and on Alaska pollack and squid. Their breeding-grounds are the rock-strewn is. shores. The bulls arrive in May and the cows in June, the pup is b. soon after the cow's arrival, and by the winter-time (Nov.) is ready to swim away with its mother, the bulls having already (in Aug.) gone to sea to feed. In their winter migrations the Commander seals penetrate to the lat. of S. Japan, and the Pribylov as far as S. California. It is the custom of the young bachelor seals to sleep away from the 'rookeries.' Those who hunt them for their fur surround them in gangs by night, and drive them inland to the killing ground, where they knock them down with clubs. This method of trapping has been superseded by 'pelagic sealing,' that is, pursuit in open waters with spear or shot gun. Pelagic hunters, however, have killed male and female indiscriminately, with the result that the species is fast dying out. Various commissions have tried to remedy this abuse. Land sealing on the Pribilof and Commander Is. from 1868 to 1897 resulted in a catch of 3,382,949 and pelagic sealing of 963,529. The gov.-owned fur-seal herd of the Pribylov Is., administered by the dept of commerce, comprises about 85 per cent of the F. S.s of the world. This herd contained 2,338,000 animals in 1941.

Fur Tribe, see DAR-FUR.

Furetière, Antoine (1619-88), Fr. lawyer and lexicographer, b. Paris. His announcement that he had compiled a dictionary of the Fr. language brought about his expulsion from the Fr. academy for alleged plagiarism, that body fearing that his dictionary was intended to supersede their own. F.'s *Dictionnaire universel* was pub. 2 years after his death, and it is a valuable work. An improved ed. was pub. by Basmage de Bauval in 1701, and the last reprint was at Amsterdam in 1725. It has survived as the basis of what is called the *Dictionnaire de Trévoux*. His other works were *Cinq Satires* (verse); *Gospel Parables* (verse); *Le Roman bourgeois*; and especially *Fureteriana* (pub. posthumously), being a collection of *bons mots* or anecdotes, which have often been parodied.

Furfuran, or Furan (C₄H₄O), organic substance obtained by heating the barium salt of pyromucic acid with soda-lime. It is a colourless liquid boiling at 32° C., is insoluble in water, and has the characteristic smell of pine-wood tar, in which it occurs. A molecule of furan may be looked upon as possessing closed chains of 5 atoms; if the oxygen atom is replaced by sulphur, thiophene is produced; if it be replaced by NH, pyrrole is produced.

Furfural, furfurol, or furfuraldehyde (C₄H₄O·CHO) is the aldehyde of pyromucic acid, and may be prepared by distilling bran with dilute sulphuric acid. It is a colourless liquid boiling at 162° C., and is soluble to some extent in water. It has a pleasant smell, and turns brown on exposure to the air. When mixed with caustic potash, furfur-alcohol and pyromucic acid are formed, and it shows general properties analogous to those of benzaldehyde. With phenol (q.v.) furfural forms resins which are widely used in the manuf. of moulded articles similar to those made from cellulose, galolith, etc. Furfural and various of its derivatives are employed as solvents, germicides, etc. See Chicago Mines Laboratories Bulletin, No. 2, 1925, *Furfural and its Derivatives*.

Furfuraturum, see CRUSCA.

Furies, or Furias, see EUMENIDES.

Furka Pass, one of the highest Alpine passes in Switzerland (7992 ft.). It leads from Andermatt, in the canton of Uri, to the Rhône glacier, passing through the Reuss valley and ending at the Hôtel Gletsch in Valais.

Furlo Pass, tunnel, some 40 yds long, excavated in the Apennines, Italy. It is part of the Via Flaminia (q.v.), the main Rom. road from Rome to Fano on the Adriatic. An inscription at the N. end records that the tunnel was made by the Emperor Vespasian, AD 77.

Furlong, see METROLOGY.

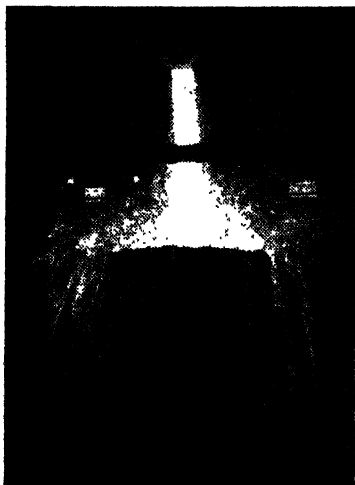
Furlough, military term once used for leave of absence (and still so used in U.S.A.). On home service it applied to non-commissioned officers and men, but on foreign service it also applied to officers.

Furnaces (Lat. *fornax*, a vault), contrivances for application of heat generated by the combustion of fuel or by electrical means. The substance to be heated is usually called the charge. In fuel-burning F. a correct admixture of air is essential for efficient combustion, and air supply is sometimes regulated by a fan (forced draught) and by dampers. The F. may be classified under 3 headings: (1) where the fuel and the charge are in contact with each other; to this class belong shaft, blast, and hearth F., used for the smelting of iron, copper, and lead ores; (2) where the charge is heated directly by the products of combustion; these are reverberatory F. When the charge is not melted the furnace is known as a 'wasting' or 'calcining' furnace; when it is, as a 'melting furnace'; (3) where the charge is not in contact with the fuel or the products of combustion. When the heating chamber is fixed and forms part of the furnace, the latter is known as a muffle furnace. Other varieties are crucible F. and retort F.

Blast F. are of great antiquity, and forms differing little from ordinary smiths' F. are now used in India. The Catalan and Walloon forges, formerly used in the production of malleable iron, mark stages in the development of blast F. The Bessemer converter (see BESSEMER PROCESS) is a blast furnace hinged so that it can turn around a horizontal axis for

tipping out the molten steel charge. Hearth F. are sometimes employed in the air reduction process of smelting iron, but they are wasteful.

Where the charge must not come into contact with the fuel itself, but is directly heated by combustion products, the fuel is burnt in a special combustion chamber placed at the side of the hearth. The body of flame and the heated gas are drawn over the working-bed and beaten down by reverberation from the low vaulted roof. The term 'cupola' was originally used for the reverberatory



Mirrorpic

TAPPING A FURNACE

Photograph taken from under the furnace, showing the molten steel running down launder from the furnace into the steel ladle

furnace, but is now used to designate a small blast furnace, such as that used by iron-founders. The 'melting' reverberatory furnace is used in the concentration of poor metallic compounds into a regulus by fusion, in the reduction of lead and tin ores, in the refining of copper and silver, and in the puddling processes of making malleable iron. The 'calcining' type of reverberatory furnace has a less extended use.

Sometimes the solid fuel is converted into gas. The success of this method is due to the easy regulation of combustion, which can be made perfect without excess of air and the possibility of a long flame and large F., even with fuel of inferior quality.

Electric furnaces are expensive to run, but the absence of smoke and ashes, freedom from contamination with noxious gases, and the ease of regulation and tele-control are important advantages. Arc F. produce the highest temps. obtainable

—4000° C. as against 2000° C., the maximum temp. in a combustion furnace. The arc may be burning in the material to be heated (gas reaction F.), or the charge may be in the path of the arc, or the arc may be outside the charge, heat being transferred by radiation. A famous gas-reaction furnace is the Birkeland-Eyde plant at Rjukan, Norway, for obtaining nitrogen from the atmosphere. Air is drawn into a 6-ft-diameter steel cylinder lined with refractory material. In the centre burns a powerful arc between 2 hollow, water-cooled copper tube electrodes $\frac{1}{2}$ in. apart. To prevent short circuit the arc is blown out into a fan shape by electromagnetic action. The arc is virtually nitrogen burning in oxygen. The NO formed is discharged through holes in the cylinder and passes up cooling-towers. The final product is calcium nitrate. Each of a series of 10MW, 3-phase generators serves 3 separate single-phase F. In other types of arc F. carbon electrodes are inserted through the walls; if the arc is to pass through the charge, the positive electrode is usually inserted through the roof of the furnace chamber, the negative in the floor, and the charge is placed between. Arc F. are used for the manuf. of calcium carbide and its derivatives, of ammonia, and other nitrogenous products, for reduction of iron ore and heat treatment of alloys. Resistance F. utilise the heat R^2 generated by a current I amps in a conductor of resistance R ohms. With indirect heating, coils or grids of nickel-chromium wire are inserted in walls, roof, and floor of the furnace chamber containing the charge. These F. are used for lacquering and japanning, for melting and refining special metals such as high-grade steel and certain alloys. The coils are controlled from outside and the furnace is suitable for processes in inert or other specified atmospheres. In direct resistance heating, the current passes through the charge. This is used for heating rivets, for granular or powdery substances, and for liquids. The electrode boiler is a direct-heating resistance furnace, the current passing through the water between 2 electrodes. In low-frequency Induction F. the charge is placed in a ring-formed trough round an induction coil. When this is supplied with a.c. the charge becomes the short-circuited secondary of a transformer and is heated by the induced current. In h.f. induction F. the charge is heated by the eddy currents generated by a h.f. (500–2000 c/s) current in a surrounding coil. In induction F. the heat is generated in the charge itself and there is no loss in radiation or convection. In h.f. heating, the depth of penetration of the heat depends partly on the frequency and is thus subject to control.

See BESSEMER; IRON AND STEEL; METALLURGY. See also Mills and Rowan, *Fuel and its Application*, 1889; Baldwin, *Steam Heating for Buildings*, 1900; J. Wright, *Electric Furnaces and their Industrial Applications*, 1906; W. E.

Groume Grimallo, *Essay on a Theory of Furnaces* (trans.), 1915; H. Armstrong, *Fuels and Furnaces for Industrial Heating*, 1938; J. W. Meares and R. E. Neale, *Electrical Engineering Practice*, 1-III, 1942; H. Etherington, *Modern Furnace Technology*, 1944.

Furneaux Islands, also called **Flinders**, group of is. between Australia and Tasmania in the Bass Strait and included within the state of Tasmania. Flinders, or Great Is., is the most important, others being Cape Barren, Clarke, Hummock, and Badger. They were discovered in 1773 by Cook's lieutenant, Furneaux, from whom they take their name. They are for the most part barren and unproductive. Pop. 1027.

Furnes (Flem. *Veurne*), tn in the prov. of W. Flanders, Belgium. It is situated at the junction of sev. canals, 16 m. N.E.



Belgian Embassy

**FURNES: THE PROCESSION OF
PENITENTS**

of Dunkirk and 27 m. SW. of Bruges. The prin. industries are the manuf. of linen and tiles; there is a trade in hops, corn, and dairy produce. A remarkable religious festival, the procession of penitents, is held at F. annually in July, when hooded and black-robed citizens carry heavy crosses through the tn. Pop. 7300.

Furness, Sir Christopher Furness, 1st Baron (1852-1912), shipowner and ship-

builder, head of shipping firm of F., Withy & Co. He was b. at West Hartlepool, Durham, and started a shipbroking business when he was 24 years of age. He next estab. the line of steamers. In 1885 he joined Edward Withy and founded the present firm. He was Liberal member for the Hartlepool div., 1891-1910, when he was raised to the peerage as a baron, and took the title of Lord F. of Grantley.

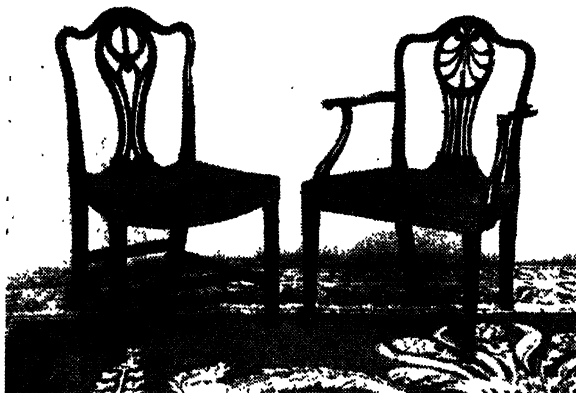
Furness, peninsula of N. Lancs, England, situated between the Irish Sea and Morecambe Bay. The ruins of F. Abbey stand in a deep valley S. of Dalton and adjacent to the F. railway. It is interesting to artists and antiquaries, being a fine example of the transition Norman and early Eng. architecture. It was founded in 1127 and was, until the Reformation, a great and wealthy Cistercian abbey. The prin. tn of F. is Barrow (q.v.), noted for its docks and iron works.

Furniss, Harry (1854-1925), caricaturist, b. in Wexford, son of a Yorks engineer; at the age of 19 he settled in London, and soon after became a regular contributor of humorous drawings to the prin. illustrated papers. He joined the staff of *Punch* in 1880, and for many years was one of its most popular illustrators. He leapt into fame with his invention of the Gladstone collar, and became known all over the world for his picture (used since by Pears' Soap as an advertisement), 'Two years ago I used your soap, since then I have used no other.' An admirable humorist, he illustrated, with success, the work of the 2 great humorists, Thackeray and Dickens. Author of many books, including *Confessions of a Caricaturist*, 1901; and *Harry Furniss at Home*, 1903.

Furniture (from Fr. *fournier*, to furnish) includes all movable goods, such as fittings, vessels, etc., provided to increase the usefulness and comfort of buildings. Until the Renaissance most household appliances were rare luxuries. The peoples of antiquity (except for kings and nobles) were satisfied with some form of table and seat, for they slept on the floor and the best hrs of their lives were spent out of doors. Up to Rom. times the woods most commonly employed for domestic furnishings were cedar, rosewood, ebony, teak, pine, and walnut, whilst bronze and electrum, silver and gold and ivory were freely used also. Under the empire, wealthy Romans had golden cooking utensils. Still, wood has always been the basis of F. and for this reason few examples of early work have lasted until to-day. The chief sources of information about Assyrian and Egyptian household fittings and likewise about those of Greece and Rome are sculptures and mural decorations. The cabinet-makers of Nineveh, as also of Thebes and Memphis, knew how to embellish their couches and tables with inlays of ivory, and often supported their chairs and thrones on legs shaped like those of wild animals; bulls, lions, and rams were favourite devices for carving. Slaves were

sometimes used as 'human furniture' being made to support the regal throne. The Greeks derived their furnishing fashions from the E., and the plutocrats of Rome patronised Gk rather than native workmen. Folding chairs, chairs with sloping and upright backs, elaborate footstools, bronze tripods, arm-chairs with sphinxes for elbow rests, splendid marble tables and candelabra, oriental couches, and all manner of bronze work damascened in gold and silver were common appendages in the palaces and sumptuous homes of the kings and aristocrats of classical antiquity. Rom. fashions were copied by Byzantine craftsmen, and under

vestments. They were the ancestors of our modern 'dual purpose' F., for when the family moved, they served as trunks for all forms of apparel. From these the modern *dressoir* or sideboard has developed. Beds were square and roofed, with panelled testers supported on carved posts. Oak and pine predominated. A word must be said of Saracenic work, for the Saracens deserve praise for the beauty and delicacy of their lattice work and inlaying, whether with silver filigree, brass, ivory, or mother-of-pearl, seen in their tall, hexagonal tables and cross-legged reading desks. After the Renaissance artisans no longer carved



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HEPPLEWHITE

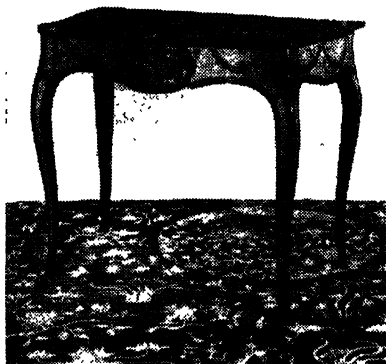
Two pieces of a set of six single and two arm-chairs, the open backs with pierced splats and carved with husks, seats covered in horse-hair

Charlemagne there fl. the Rheno-Byzantine school of art, whose best work appears in their magnificent enamelled shrines and reliquaries. In the Middle Ages beds and chairs were still largely restricted to the upper classes, but in the castles and manor houses of the Norman barons household appliances were rapidly developing both in number and artistic worth. The F. of these times was sombre, heavy, dignified—strictly masculine in feeling. The 'linen-fold,' a design taken from the folds of the purificator used at mass, was often employed as decoration on the big chests and portable presses so typical of the times. These chests were made at home and had wrought-iron clasps and hinges and iron strap-work ornamentation or sometimes panels of tempera painting on gilt backgrounds. They were used as repositories for money and valuables; in churches and monasteries they were also used for eccles.

episodes from the lives of the saints or the cycles of romance, for these were superseded as decorative material by the fashion for classical mythology. During the Quattrocento period in Italy (1400-1500) sumptuous F. of every description was executed at the bidding of the Medici and other patron princes. The fashion for gilt grounds, *pietra dura* work, that is, the inlaying of slabs of coloured and richly veined marbles, and *tarsia*, or *certosina* work, or inlaying of wood in geometrical patterns or floral designs, came quickly into vogue and spread rapidly across the Alps to other countries. During the reign of Henry VIII, Jean de Mabuse and Holbein introduced It. fashions into England, and in France, as the result of the infiltration of It. craftsmen, a mass of heavy and rich F. was made, but the frequent use of strap-work and the cartouche, which characterises the Henri Deux style, is peculiarly Fr.

The Jacobean and Restoration styles, though overshadowed by the great *floraison* in F., which marks the 18th cent. throughout Europe, evolved directly from the Elizabethan solidity (e.g. the famous 'great bed of Ware'), and were marked by increased use of upholstery, the evolution of present types of chair from the old, box-like structures, the appearance of simple sofas and gate-legged tables. Carving, though still abundant, became lighter and walnut began to come into its own. Under William and Mary, the Dutch influence brought a notable increase in comfort. The upholstered wing-chair (which has lasted till to-day),

for which they were designed. His designs incorporated Wedgwood plaques, low relief carving, gilding, and marble console tops. Sheraton's genius contributed much, including the kidney-shaped desk and table, sectional book-cases, and 'pouch' sewing tables. His book, *Cabinet Makers' and Upholsterers' Drawing Book*, 1791, 1793, 1802, greatly influenced cabinet-makers on both sides of the Atlantic. The inspiration of these men was clearly drawn from the Fr. artist Boulle, who owed his excellence in marquetry work to Florentine and Venetian craftsmen. Boulle belongs to the Louis Quatorze period—the *armoire* in



SHERATON

Satinwood side-table (one of a pair) with serpentine sides and slightly cabriole legs



CHIPPENDALE

Walnut desk chair with seat covered in leather

the slant-top desk, corner cabinets for display of china, all now made their appearance. Queen Anne F. included secretaires, grandfather clocks, tallboys and lowboys. Carved mahogany began to replace walnut and Chinese influence was evident. The heyday of cabinet-making in Britain is associated with the names of Chippendale, Sheraton, Hepplewhite, and Adam. Chippendale's famous designs formed a transition from Queen Anne to late Georgian styles. His *The Gentleman and Cabinet Maker's Director*, 1754, became a classic. Hepplewhite's aim 'to unite elegance with utility' made his F. less magnificent than Chippendale's but distinguished by lightness and grace. He used the urn shape, the 'Prince of Wales's Plumes,' wheat blossoms, garlands and swags in decoration. Robert Adam introduced the important idea of harmonizing all the furnishings and the decorative detail with the architecture

the Jones' collection at the Victoria and Albert Museum, South Kensington, London, is a beautiful example of his work—but though this period and the succeeding ones, the regency and the Louis Quinze or rococo, afford much that is both sumptuous and elegant, the cabinet-maker's art reaches its high-water mark just before the Fr. revolution, that is, in the reign of Louis XVI. In the South Kensington Museum may be seen some splendid specimens of the work of Röntgen, Riesner, and Gouthière, who enjoyed the patronage of Marie Antoinette. Gouthière was the first founder and chaser of his day, and used to mount in ormolu or bronze-gilt the elegant commodes and cabinets which the other two had made. These men turned their backs on the frivolous, rampant vagaries of Meisssonier and other apostles of the rococo school and developed a beautiful restraint and delicacy accentuated by their preference

for classic forms. Thus the 'riotous curves' of the du Barry period gave place to medallions and straight-lined patterns, which heralded a purer style. The transitional work between the restrained classicism of Louis XVI and the heavier Empire style is known as Directoire F., and shows a gradual loss of delicacy and increasing use of Rom. motifs. The Regency styles were much affected by the Directoire interpretation of classicism, but they were more severe, stiff and formal. Pedestal base tables were popular, chairs with Gk circular backs, sofas with rolled ends, bookcases with copper wire screening in front. Mahogany and rosewood, black lacquer, gold banding, and marble tops were fashionable. Rooms were dignified and simple, but this period merged into the 'English Empire' and so to the Victorian hotch-potch of over-elaboration. F. became clumsy and awkward, rooms overfilled with love-seats, what-nots, and hanging cupboards. Marble, ebony, black walnut, and mahogany were used profusely. Bygone styles were copied by poor methods of machine manu. Characteristic of the period is artificiality and imitation with touches, however, of real sentimental charm and often a homely picturesqueness. Wm Morris and the Arts and Crafts centre led a revolt against such fashions and encouraged a group of enthusiasts to design and make F. of a simple and high standard. The best known of the group were Ernest Gimson, Ambrose Heal, and the Barnsleys. This F., small in amount and known only to a limited public at the time, did much to establish Britain in the lead for design and hand craftsmanship, the high standard was maintained in every detail. In the period between the 2 world wars, however, when wood-working industries had become fully mechanised, there was little designing for the special needs of machine-made F. Quantities of imitation 'period' F. of poor quality flooded the market. A limited number of firms continued to produce good pieces in the Gimson tradition but these were mostly hand made and therefore too expensive for popular use. Shortage of timber during the Second World War led to rationing of F. An advisory committee of leading designers, appointed by the President of the Board of Trade, produced specifications for 'utility' F. Limited in range and varying in quality, this was, however, of good proportions and pleasing appearance. Since then, the use of plywood and laminated woods, new strong glues and heat- and stain-resisting finishes, are stimulating the production of new designs for use with the machine. Modern methods make it possible for F. to be strong while appearing very light and 'airy.' This effect has been used with great success in Scandinavian countries, but in all modern developments furnishing effects now depend largely on colour schemes and overall impressions.

The manu. of Amer. F. has developed

along much the same lines as Eng., but the influence of the early settlers' countries of origin, combined with pioneer and local conditions and materials available, have produced many interesting and purely Amer. designs and styles. Early Amer. F. included the 'Connecticut Chest' and the 'Hadley Chest' (which later developed into the 'Governor Winthrop' sloping lidded desk), and the Boston Rocker. The Amer. Federal styles included 'Martha Washington' chairs, and 'Bull's Eye' mirrors with carved frames topped by an eagle. The Amer. Post-Federal period was marked by the influence of the great cabinet-maker Duncan Phyfe and also of Samuel McIntire. Local styles of furnishing, such as 'Pennsylvania Dutch', 'French Provincial', etc., mark contemporary decoration schemes with distinctive and individual beauty. Many of the modern furnishing trends to-day originate in America, notably the great new emphasis on kitchen F. and decor, where modern 'functional' designs and materials have combined at their very best to give an entirely new dress to the Cinderella of the furnishing family.

See T. Chippendale, *The Gentleman and Cabinet Maker's Director*, 1754; L. V. Lockwood, *Colonial Furniture of the Pilgrim Century*, 1921; R. Edwards, *Sheraton Furniture Design*, 1946, and *Hepplewhite Furniture Designs*, 1947; R. W. Symonds, *Chippendale Furniture Designs*, 1948; H. Gordon, *Old English Furniture*, 1948; J. and R. Hooper, *Modern Furniture and Fittings*, 1949; J. Gloag, *English Furniture*, 4th ed. 1952, and *Short Dictionary of Furniture*, 1952; P. Macquoid and R. Edwards, *Dictionary of English Furniture* (Middle Ages-late Georgian), 2nd ed. 1954.

Furniture Cream, mixture used for polishing chairs and sideboards, etc. Beeswax and resin are dissolved in heated turpentine and then mixed with a solution of powdered soap and carbonate of potash. When applied to wooden surfaces, the oil dissolves the former polish and the other constituents make a new one.

Furnivall, Frederick James (1825-1910), philologist and editor, b. Egham, Surrey. Educ. at London Univ. and Cambridge, he founded 7 societies for the promotion of literary appreciation and for the pub. of texts. These were the Early Eng. Text Society, 1864, the Chaucer, 1868, Ballad, 1868, New Shakespeare, 1874, Browning, 1881, Wydliff, 1882, and Shelley, 1886. By means of these associations he collected as much as £30,000, which was expended in issuing cheap eds. of a number of early texts and rare works of literary merit, which thus became accessible to a large circle of interested students. Many of the texts were ed. by F. himself, but his great work as editor was his issue of *A Six-text Print of Chaucer's Canterbury Tales in Parallel Columns*, 1868-75, which was an exact replica of 6 original MSS. F. further supervised the pub. of a series of facsimiles of the quartos of Shakespeare's plays, and for some years was editor of the

Oxford *New English Dictionary*. F. was in his day a splendid oarsman, and in 1885 introduced races for souling fours and eights. See *Frederick James Furnival: a Volume of Personal Record* (reminiscences) by 49 contributors, with a biography by J. Munro, 1911.

Furnival's Inn, see INNS OF COURT.

Furse, see FUR.

Furse, Charles Wellington (1868-1904), painter, b. Staines. He studied in Paris, and, returning to London, made a name by pictures exhibited at the Royal Academy and New Eng. Art Club. His most famous work is 'Diana of the Uplands,' open-air in feeling. A fine decorative sense also appears in his mural decorations for the tn hall at Liverpool. Among his other pictures are 'The Return from the Ride,' 'The Lilac Gown,' and 'Cubbing with the York and Ainsty.' His early death was a serious loss to Brit. art.

Furse, Roger (1903-), designer and painter, b. Ightham, Kent. Educ. St George's Choir School, Windsor and Eton. He began as stage designer in 1934 and speedily became one of the most successful. He has designed settings and costumes for stage productions of all kinds and has been responsible for many of the Shakespearean productions at the Old Vic and Stratford-on-Avon, as well as for productions such as *The Mousetrap* and *The Sleeping Prince*. During the Second World War he was temporarily released from the R.N. to design the costumes and armour for the film of *Henry V*, and he was responsible for the décor in *Richard III*. He has been equally successful in New York.

Fürst, Julius (Heb. name, Al-sari) (1805-73), Jewish historian, Heb. bibliographer and lexicographer. 1864 onwards, prof. at the univ. of Leipzig. Editor of *Orient*, 1840-52. Main works: *Lehrgebäude der aramäischen Idiome*, 1835. *Aramäische Chrestomathie*, 1836. *Bibel-Konkordanz*, 1837-40. *Bibliotheca Judaica*, 3 vols., 1849-63. *Hebräisches und chaldäisches Handwörterbuch*, 2 vols., 1857-61. *Geschichte des Kabbalismus*, 3 parts, 1862-7, and *Geschichte des jüdischen Literatur*, 2 vols., 1867-70.

Fürstenberg, Ger. tn in the dist. of Frankfurt an der Oder, on the Oder (q.v.), 15 m. SSE. of Frankfurt (q.v.). It is at the end of the Oder-Spree canal, and has metal industries. Pop. 6000.

Fürstfeldbruck, Ger. tn in the Land of Bavaria (q.v.), on the Amper, 15 m. W. of Munich (q.v.). It is a spa, and has auct houses and a fine 18th-cent. baroque church. Pop. 11,000.

Fürstenwalde, Ger. tn in the dist. of Frankfurt an der Oder, on the Spree and the Oder-Spree canal, 20 m. W. of Frankfurt (q.v.). It was a bishopric, 14th-16th cents. There are textile and engineering industries. Pop. 25,000.

Fürth, Ger. tn in the Land of Bavaria (q.v.), at the confluence of the Regnitz (q.v.) and the Pegnitz, 5 m. NW. of Nuremberg (q.v.). It dates from the 7th cent., and has a fine 12th-cent. Gothic church and numerous buildings of the

17th and 18th cents. The F.-Nuremberg railway was the first in Germany, 1836. There are engineering, metal-goods, and brewing industries, and there is an airport. Pop. 101,050.

Fürth im Wald, Ger. tn in the Land of Bavaria (q.v.), on the Czechoslovak frontier, 98 m. NE. by N. of Munich (q.v.). Pop. 9500.

Further Education, see ADULT EDUCATION.

Furtwängler, Adolf (1853-1907), Ger. archaeologist, b. Freiburg-im-Breisgau. He took part, 1878-9, in excavations at Olympia. Assistant in Berlin museums, 1880; prof. and keeper of antique records, in Munich, 1894. In 1901-7 he undertook excavations in Aegina, Amyklao, and Orchomenos. Wrote *Meisterwerke der griechische Plastik*, 1893. *Die antiken Gemmen*, 1900. *Griechische Vasenmalerei*, 1900. *Agina*, 1906, and *Klassische Schriften*, 1912-13.

Furtwängler, Wilhelm (1856-1954), Ger. conductor, b. Berlin, son of Adolf F. (q.v.). Studied in Munich; was in the court theatre under Mottl, 1911-15. Conducted opera in Munich, and (1915-19) in Mannheim. Conducted (1920-2) symphony concerts of Berlin state orchestra, and Frankfurt museum concerts; and, 1922-7 (as successor to Nikisch), Leipzig Gewandhaus concerts. Conductor of concerts of Gesellschaft der Musikfreunde, Vienna, 1921-30. Conducted at Philharmonic concerts, New York, 1926-7; Vienna Philharmonic concerts, 1927-30; director of the Berlin Philharmonic concerts, 1922-34, and from 1935 to his death; of the Berlin state opera, 1933-4; permanent guest conductor, Vienna Philharmonic orchestra and Vienna state opera; conductor, Bayreuth festival, 1931, 1936-7, 1943-4. In Dec. 1946 a Ger. denazification tribunal accepted F.'s application to have his name and record cleared, on the ground that his return to musical life in Germany after Hitler came to power was due to misunderstanding of the conditions in Nazi Germany. See monographs by O. Schrenk, 1940, and F. Herzfeld, 1941.

Furuncle, see BOIL.

Furze, see ULEX.

Fusan, or Fusan, important seaport on the SE. shore of Korea, is the terminus of the railway from Seoul. This treaty port was opened to Jap. trade in 1876 and later on to foreign trade generally. The tn consists of 2 parts, the native part and the Jap. settlement, which is the new part. The chief exports are rice, beans, hides, and silks, while cotton goods and Jap. goods are imported. The fisheries are also of some importance. It has a good harbour. Pop. about 180,300.

Fusaro, Lake of (anot *Acherusia Palus*), small It. lake, in Campania (q.v.), on the NW. promontory of the Bay of Naples (see MISENO, CAPO). The ruins of Cumae (q.v.) are near by. Oysters and fish are bred in the lake.

Fuse, or Fuze, contrivance for igniting the explosive element in a blasting cartridge or shell at the required moment. A F.

may be required to be instantaneous or it may be designed to delay the explosion.

F.s for blasting (q.v.) are either slow-burning or electrical. In the former case a cylindrical packing with a core of gunpowder (q.v.) is used. As ordinarily prepared this burns at the rate of about 2 ft per min., and takes effect on the detonating cap which then explodes the main charges. An electrical F. is constituted by inserting the ends of 2 insulated copper wires in the detonating cap. The wires are then attached to long wires leading to a battery deposited some distance from the scene of the explosion.

F.s for shells and bombs are either percussion or time F.s. Percussion F.s are actuated either by pressure or by rotation induced by the rifling, whereby a needle is set free or unlocked, in order to cause the explosion or impact. If the F. is operated by direct impact only it must necessarily be of sufficient strength to obviate explosion at the discharge of the gun. Time F.s usually depend on 2 channels of slow burning F. composition which is ignited by the discharge of the gun: these channels are movable with respect to each other, so that the distances from the point of first ignition may be adjusted to determine the time to elapse before explosion. Time F.s may also be operated by clockwork. F.s for bombs, rockets (q.v.), and guided missiles are operated by electronic devices. *See also* AMMUNITION; EXPLOSIVES; FIREARMS.

Fuses, safety devices inserted in a circuit to prevent the current rising to values causing overheating, damage to insulation, and eventually fire. A fuse is a wire of tin, copper, or silver of such dimensions that it melts ('blows') and so interrupts the circuit as soon as the current exceeds the maximum the circuit can safely carry. In the simple wire fuse the wire, bare or in an asbestos tube, is fixed between 2 terminals in a porcelain handle, which fits into spring contacts on the fuseboard. When the fuse is inserted, the wire closes the gap between the contacts. House installations are usually divided into groups, each with its own fuse, all F. being assembled on the fuseboard. The usual ratings are 5 A. for lighting and 10-15 A. for power. A 5 A. fuse on 240 V. would carry $5 \times 240 = 1200$ W. or 20 lamps of 60 W. each. In power stations and distribution networks high-rupturing-capacity (hrc) F. are used together with circuit-breakers, as they act more rapidly on severe overload or short circuit, while circuit-breakers allow more accurate rating. In hrc F. the silver wire is enclosed in powdered quartz in a ceramic container.

Fusee, or **Fuzee**, *see* WATON.

Fusel, or **Fousel**, **Oil**, also called **Potato Spirit**, consist chiefly of amyl alcohol ($C_5H_{11}OH$), but with it are also mixed butyl and propyl alcohol. It is a colourless fluid with an oppressive smell and a burning taste. Commercially it is used for making peardrops and other forms of amyl acetate for flavouring purposes, patent varnishes, and essential oils.

When potatoes, rye, and barley are fermented and the liquor distilled, it will usually be found to contain F. O., which becomes gaseous at a higher temp. than either alcohol or water. It is a constituent of most inferior spirits, but is not poisonous, though it produces undesirable physiological effects.

Fuseli, or **Fusoli**, **Henry**, or **Fusseli**, **Johann Heinrich** (1741-1825), Swiss artist and writer, b. Zürich. He studied art in Italy, and then took up his residence in London, where he was known by the name of Henry Fuseli. He was elected R.A. in 1790, and about 1798 became a prof. of painting at the academy. His pictures, which testify to his wonderful imagination, are somewhat lacking in their method of execution. He painted 'The Nightmare,' 1782, and illustrations for both Shakespeare's and Milton's poetry. He wrote *Lectures on Painting*, 1801-20. His collected works, with a life by J. Knowles, were pub. in 1831. *See* P. Ganz, *The Drawings of Henry Fuseli*, 1949.

Fushiki, or **Fushigi**, old seaport in Toyamaken, Japan, on the mouth of R. Koyabe, facing the Japan Sea. Although historically significant as one of the earliest open ports of the country, it is now only of local importance.

Fushimi, a ward of Kyoto city, Japan. It was formerly a separate tn, where a battle was fought between the imperialists and the followers of Shogun in 1668. Pop. 31,000.

Fusible Metal, general term applied to certain bismuth alloys which have a particularly low melting point. The chief varieties are (1) Newton's metal, containing 50 per cent bismuth, 31 per cent lead, 19 per cent tin; melting point 95° C.; (2) Darcel's metal, containing 50 per cent bismuth, 25 per cent lead, 25 per cent tin; melting point 93° C.; (3) Rose's metal, containing 50 per cent bismuth, 28 per cent lead, 22 per cent tin; melting point 94° C.; (4) Wood's metal, containing 50 per cent bismuth, 24 per cent lead, 14 per cent tin, 12 per cent cadmium; melting point 73° C.; A useful property of these alloys is that they expand on solidification, and therefore give a sharp definition when cast into an intricate shape. Such metals are also used as safety plugs in steam-boilers, when, if the water level falls too low, they are melted and act as a safety valve.

Fusiliers, originally soldiers armed with a 'fusil' or lighter musket than the rest of the infantry. The term F. now has only an historic significance. *See also* the names of the various regiments: LANCASHIRE FUSILIERS; ROYAL FUSILIERS; SCOTS FUSILIERS; ROYAL; WELCH FUSILIERS; ROYAL, etc.

Fusion Welding, *see* WELDING.

Fust, **Johann** (d. 1466), wealthy burgher of Mainz, Germany, who financed Gutenberg (q.v.). These two, with Schoeffer, F.'s son-in-law, developed the practice of printing. When F. foreclosed the business passed to Schoeffer, whose masterpiece was a Lat. psalter, 1457, the initial letters in which were printed in red and

blue. F. is sometimes supposed to have been the original of the Faust (q.v.) legend.

Fustel de Coulanges, Numa Denis (1830-89), Fr. historian, b. Paris. He was prof. at Amiens, Paris, and Strasburg; in 1870 he was appointed to the École Normale, Paris, and afterwards became a prof. at the Sorbonne. His most famous work is *La Cité antique*, 1864 (trans. into Eng., 1874). Other works include *Histoire des institutions politiques de l'ancienne France*, 1875-92, and *La Gaule romaine et le royaume des Francs*, 1888-91. F.'s importance lies in his assertion that the early institutions of France were less indebted to Teutonic than to Rom. origin. See P. Giraud, *Fustel de Coulanges*, 1896, and P. E. Champion, *Les Idées politiques et religieuses de Fustel de Coulanges*, 1903.

Fustian, cotton fabric. The name is an old one, said to be derived from El-Fustat in Cairo. During the Middle Ages women's apparel and priests' vestments were made of F., but to-day the material is commonly used for labourers' clothes. It is the cotton equivalent of silken velvet, and is variously known as velveteen, corduroy, and moleskin. Jean, which is a thick, twilled cotton cloth, is one kind of F., and corresponds to satin in silk stuffs. F. is dyed many colours, mostly dark.

Fustie, name of 2 dyestuffs. Old F. is the wood of the *Maclura tinctoria*, a tree indigenous to the West Indies and Brazil. The dye from it is yellow, and was widely used before the introduction of aniline dyes for animal fibres, especially wool. Young F. is the wood of the smoke plant, *Rhus cotinus*; as a dye the yellow colour derived from it is very fugitive to light, but it is much employed in tanning operations. See DYK.

Futa-Djalon (Fouta Djallon), dist. of Fr. Guinea, West Africa, having an area of about 42,500 sq. m. The cap. is Labé. It stands at an elevation of about 4000 ft. with beautiful scenery and a pleasant climate. It is mainly inhabited by Fulani. The chief products are cattle, gold and other metals, rice, and cotton. Its chief rivs. are the Senegal and Gambia, both of which rise here, while Tuba is the largest city. Pop. about 700,000. See also FRENCH GUINEA.

Futa-Toro, ter. of West Africa in the N. portion of Fr. Senegal. It produces pigeon and tamarinds. Pop. about 120,000.

Futhark, see RUNES.

Futures, commercial term applied to the purchase of a commodity (merchandise, stocks and shares) with a view to delivery at a future date. The practice lends itself to speculation since a person may sell in the hope that by the time of delivery the price will have fallen and he can repurchase at a cheaper rate. Such speculation helps to even out price fluctuations over a time.

Futurism. This movement was founded in 1909 by the It. poet, Filippo Tommaso Marinetti, and spread to art and music, as well as to letters. It represented in an extreme form the reaction against the past and approval of the speed and

mechanical powers of the 20th cent. In 1911 Marinetti pub. his work *Le Futurisme*, and in Feb. of that year he arranged an exhibition of the work of 5 It. painters in the Bernheim Jeune gallery in Paris. These artists, Umberto Boccioni, Carlo D. Carra, Luigi Rossolo, Giacomo Balla, and Gino Severini, issued a 'profession of faith,' in which they stated that they were young and their art was of violently revolutionary nature; they expressed their strong hatred of the academic in art, and showed that their aim was to portray movement. Painting and sensation, they declared, were inseparable words, and 'what must be rendered is *dynamic sensation*—that is to say, the particular rhythm of each object, its inclination, its movement, its interior force. . . we thus arrive at what we call painting of states of mind (*la peinture des états d'âme*). In the summer of 1913 (20 June to 16 July) Boccioni organised an exhibition of his own works, his paintings and sculptures; but in later years he developed a different and more intelligible style, which showed him as a sculptor of note. As a movement F. was short-lived. See also SURREALISM. In 1920 Marinetti issued *I Manifesti del futurismo* in 4 vols. in Milan. See G. Coquilott, *Cubistes, Futuristes, Passicistes*, 1914, also *Cahiers d'Art (un demi-siècle d'art italien)* (various writers), 1950.

Fux, Johann Joseph (1660-1741), Austrian composer, see GERMAN AND AUSTRIAN MUSIC.

Fuze, see FUSE.

Fuzuli (d. 1662), Turkish poet, see TURKEY, Literature.

Fyleman, Rose, see CHILDREN'S BOOKS.

Fyllot, see SWASTIKA.

Fyn (Ger. Fünen), second largest is. of Denmark, situated between the Cattegat, the Little Belt, and the Great Belt. It is 50 m. long by 40 m. wide, and is fertile and well wooded. Flax, fruit, grain, and hemp are cultivated. Bee-keeping, and cattle and horse rearing are carried on and provide the prin. exports. The fisheries are also important. Chief tns: Odense (cap.), Svendborg, and Nyborg; area 1150 sq. m.; pop. (1957) 366,330.

Fyne, Loch, inlet of the sea in Argyll, Scotland, extending in a northerly and north-easterly direction from the Sound of Bute for c. 40 m., having the dists. of Kintyre, Knapdale, and Mid Argyll on the W., and Cowal on the E. Inverary (q.v.) stands on the W. shore some 8 m. from the head of the loch. Tarbert is the centre of the famous herring industry. Maximum depth, 624 ft.

Fyzabad (Faizabad), city of Uttar Pradesh state, India. Ajodhya (q.v.), once a city of great native splendour, is now a suburb. The Mausoleum of the Bahu Begum is the finest in the state. It is 140 ft high. Bahu Begum was one of the 2 Begums of Oude whose alleged ill-treatment was a subject of the indictment of Warren Hastings. F., once the cap. of Oude, has diminished in importance since the death in 1816 of Bahu Begum, who resided here for many years.

G: 1. Seventh letter of the Eng. alphabet. The Semitic *gimel* (= Gk *gamma*) passed through the Etruscan alphabet to Lat. and became **C**, originally employed for both *k* and *g* (see **C**). At a later stage a change (attributed to Appian Claudius Censor in 312 BC) was adopted to denote the voiced guttural stop *g*. This consisted in the addition of a bar to the lower end of **C**, thus converting it into **G**. This letter was placed in the position of the *zeta* in the Gk alphabet, which was dropped (see **Z**). At a later period the Lat. *g* was palatalised before front vowels. O.E. **G** may be considered under 3 headings: (1) As an *explosive* or *stop*. It was a voice-guttural stop in the forms *ng*, *gg*, developing into hard *g* (cf. O.E. *singan*, *frogge*; Mod. E. *sing*, *frog*). When *ng*, *gg* was followed by *i* or *j*, it was a voiced palatal stop, developing into the sound *dje* (cf. O.E. *sengean*, *cege*; Mod. E. *singe*, *edge*). (2) As a *spirant* **G** was a voiced guttural spirant initially when followed by an original guttural vowel (*a*, *o*, *u*) or by a consonant, and medially when following an original guttural vowel or a consonant. Initially it developed into Mod. E. hard *g*, except before *n*, when it became silent (cf. O.E. *gās*, *gripan*, *gnagan*; Mod. E. *goose*, to *grip*, to *gnaw*). Medially it became palatalised (cf. O.E. *burga*; M.E. *burwe*; Mod. E. *borough*). Finally **G** was a voiceless guttural spirant when following a guttural vowel or consonant, and often was vocalised to *h*. It is present in Mod. E., but is silent or pronounced as an *f* (cf. O.E. *hēah*, Mod. E. *high*; and O.E. *gendg*, *gendh*, Mod. E. *enough*). Initially before, and medially and finally after, an original palatal vowel **G** was a voiced palatal spirant. Initially it developed into Mod. E. *y*, otherwise becoming vocalised to *i* (cf. O.E. *zieldan*, *daeg*; Mod. E. *yield*, *day*). (3) O.E. **G** also represented the Germanic *j*, and as such was always a palatal spirant, represented in Mod. E. as *y* (cf. O.E. *geong*, *gēa*; Mod. E. *young*, *yea*). The M.E. symbol *ȝ*, used through Fr. influence, was used much later in Scotland than in England, and may still be noted in such words as *capercailzie*, *Menzies*. To the forms of Mod. E. **G** already noted may be added the hard *g* before *e*, *i* in words of Teutonic origin, e.g. *give*, *get*, and in Heb. proper names, *Gideon*, *Gehenna*. As an initial preceding *n* **G** has become silent, and *gn* is sounded in many words of Fr. origin as *sign*, *feign*. It may or may not be pronounced hard medially, e.g. *singer*, *younger*. See **ALPHABET**.

2. In music, is the 5th note of the ascending diatonic scale of **C**, major or minor, the dominant of the key of **C**. The scale of **G** major has a key signature of 1 sharp, that of **G** minor of 2 flats.

Ga, important people of Ghana (q.v.), living in the coastal region S. of Ashanti (q.v.). They live mainly in the large towns along the coast of Ghana. See M. J. Field, *Social Organisation of the Ga People*, 1940.

Gaba Tepe, headland on the E. end of the Gallipoli peninsula in Turkey, between Suvla and Krithia. During the First World War the Australian and New Zealand Army Corps, under the command of Gen. Birdwood, landed just N. of the headland on 25 April 1915. The Turks attacked heavily in this locality, but failed to move the Brit., who, however, made little progress, and finally withdrew in the following Dec. See **GALLIPOLI CAMPAIGN**.

Gabbard, Battle of the, naval battle fought during the first Dutch war (1652-4) between an Eng. fleet of 105 vessels, with 16,000 men, under Adm. Blake, and a smaller Dutch fleet under Tromp. See D. Mathew, *The Naval Heritage*, 1945.

Gabbatha, 'an eminence', place of Pontius Pilate's judgment seat which John (xix. 13) calls Lithostratos, the paved place, part of the Herodian fortress, the Antonia. It has been excavated and shown to be a paved space more than 50 yds square on the highest spot of the city to the E.

Gabbro, group of basic igneous (plutonic) rocks. They have a completely crystalline granitoid texture, and usually occur as large sheets or bosses. The chief mineral constituents are plagioclase, generally a soda-lime or lime felspar—labradorite being the commonest, though anorthite is often present in abundance—together with augite, magnetite, and sometimes hornblende or olivine. Apatite is almost invariably present. Generally the felspar is embedded in great crystals of augite which have evidently developed last of all. The composition of these rocks shows from 45 per cent to 55 per cent of silica and a large proportion of lime and magnesia. The proportion of alkalis is small. There are **G. areas** in Cornwall, in Ayrshire, in Mull, and in Skye. The composition of **G.** bears a very close resemblance to that of dolerite. Nickel, chromium, or platinum ores are sometimes associated with **G. intrusions**.

Gabelenz, Hans Conon von der (1807-1874), Ger. linguist and politician. He pub. numerous works on the Gothic, Finno-Ugrian, Mongolian, Malayo-Polynesian, and the native Amer. languages.

Gabelle (Low Lat. *gabulum*, a tax), term applied in France to a tax on various articles, but more particularly to the tax on salt. It was apparently first levied by Philip IV in 1286, and was made permanent by Charles V. In general it compelled all above the age of 8 to

purchase, every week, a fixed quantity of salt at a set price, though details of the G. varied from prov. to prov., some being exempt altogether. It was most unpopular, and was finally abolished in 1790.

Gabelsberger, Franz Xavier (1789-1849), b. Munich, inventor of a Ger. system of shorthand. The formation of his signs in shorthand corresponded as far as possible with the written characters of the Ger. alphabet, and his method is still used in Ger.-speaking countries.

Gaberlunzie, old Scottish name for a beggar or tinker, who was so called from his wallet. Scott's *Kidie Ochiltree* in *The Antiquary* is a good example of the professional beggar. Tradition has it that the author of the song or ballad entitled *The Gaberlunzie Man* (see *Percy Reliques*) was King James V of Scotland, who was noted for strolling about his dominions in the disguise of a tinker or beggar.

Gabes, see **CABES**.

Gabii, ant. tn of Latium, situated on the Via Praenestina, about 12 m. from Rome. It was famous for its baths, and the Emperor Hadrian built a senate house (Curia) and an aqueduct there.

Gabinus, Aulus, Rom. gen. and prov. governor. As tribune in 67 BC he proposed the *Lex Gabinia*, which conferred on Pompey his extra-ordinary command against the Mediterranean pirates. As consul in 58 G. supported Clodius in banishing Cicero. From 57 to 54 he was governor of Syria, and in 55 restored Ptolemy Auletes to the Egyptian throne. Impeached for mis-government on retiring from office, G. went into exile; but he returned to support Caesar in the Civil war, and d. on active service in Dalmatia (48 or 47 BC).

Gabirol, see **IBN-GABIROL**.

Gable, Clark (1901-), Amer. actor, b. Cadiz, Ohio; his third wife was Carole Lombard, the actress. He started as a call boy, toured with the Jewell players, and appeared on Broadway. He entered films in 1931 in *The Painted Desert*. His better-known films include *China Seas*, *Forsaking All Others*, *Mutiny on the Bounty*, *San Francisco*, *Idiot's Delight*, and *Gone With The Wind*, in which he was ideally cast as Rhett Butler. He won the Academy Award for the best male performance of the year in *It Happened One Night*, 1934.

Gable, the triangular piece of walling at the end of a double-pitched roof. In timber-framed houses, the G.s are of timber, and often overhang the lower storey (see illustration).

Gablonz, see **JABLONEC NAD NISOU**.

Gabon, or **Gabun**, dist. on the W. coast of Africa, which forms part of Fr. Equatorial Africa. It was discovered by Portuguese in 1485 and received its name from its fancied resemblance to a cabin; the Fr. first settled there in 1839. G. has an area of about 93,218 sq. m., and its chief rvs. are the Ogowe and the G. The surface is flat near the coast, but behind this rises to a plateau at a height of 3000 ft. The climate of the coast is unhealthy; that of the plateau is better. The

natives grow manioc, bananas, nuts, and tobacco, while the Europeans cultivate coffee, cocoa, and vanilla. The chief exports are palm kernels, palm-oil, and timber. In the Second World War, in 1940, after the collapse of France, the dist. espoused the cause of the Free Fr. under Gen. de Gaulle. Pop. 408,516 (1936). Cap. Libreville. See also **FRENCH EQUATORIAL AFRICA**.

Gaboriau, Emile (1835-73), Fr. writer of detective novels, b. Saujon. He began by writing for the Parisian papers and became famous at once when his story



A farmhouse at Forthampton, near Tewkesbury, Gloucestershire

L'Affaire Lerouge was pub. in 1866 in *Le Pays*. He quickly wrote others: *Le Crime d'Orléans*, 1868, *Monsieur Lecoq*, 1869, *Les Esclaves de Paris*, 1869, *La Vie infernale*, 1870, and *L'Argent des autres*, 1874, which have become classics of detective fiction. See **DETECTIVE STORY**.

Gabriel (Heb. 'man of God'), archangel who explained to Daniel the vision of the ram and the he-goat, and appeared to Zacharias to announce the birth of John the Baptist, and to the Blessed Virgin to announce the birth of Christ. He is called archangel by both Jewish and Christian writers and is mentioned in the book of Enoch as the one who is set over 'all the powers.' The Targum ascribes to him the destruction of the host of Sennacherib. He is venerated also by the Muslims, who give him the titles of Holy Spirit and Spirit of Truth.

He appears in the Koran, where his special work is divine revelation.

Gabriel, Ange Jacques (1698-1782), Fr. architect, b. Paris, son of Jacques Jules G. (q.v.); succeeded his father as *premier architecte du Roi*, 1742, retiring 1775. In that capacity he made alterations to the palaces of Versailles, Fontainebleau, Marly, Choisy, and Compiègne; laid out the Place de la Concorde, Paris, 1749-53; and designed the École Royale Militaire, 1751; the Petit Trianon, Versailles, 1762-6; the Royal Opera House, Versailles, 1748-70; and the Ministry of Marine, Paris, 1767-70.

Gabriel, Jacques (Jules) (1667-1742), Fr. architect, b. Paris, son of the architect Jacques G., and father of Ange Jacques G. (q.v.). Became *architecte du Roi*, 1687, and *premier architecte*, 1735. Besides numerous bridges, he designed the facade of the cathedral at La Rochelle, c. 1740; the Hôtel de Ville at Rennes, 1734-43; the Archbishop's Palace at Blois, 1725; the Hôtels Biron and de Varangeville, etc.

Gabrieli, Andrea (c. 1520-86), It. organist and composer, b. and d. Venice, one of the 2 chief figures of a special Venetian school which cultivated an antiphonal style suited to the 2 choir-galleries and 2 organs of St Mark's Church. He was a pupil of Willaert and seems to have visited the Rhineland, Bohemia, Munich, Graz, and Augsburg. He was appointed second organist at St Mark's in 1566 and first in 1584. He wrote madrigals, instrumental sonatas, organ works, and especially church music with instrumental parts.

Gabrieli, Giovanni (1557-1612), It. organist and composer, nephew and pupil of the preceding, and the second great representative of the antiphonal Venetian school. He assisted Lassus at Munich in 1575-9 and became second organist at St Mark's, Venice, in 1585, retaining that post, which was concurrent with, rather than subordinate to, the first, until his death. He had many foreign pupils, including Hassler and Schütz, and composed madrigals, organ music, and eccles. works for voices and instruments which imitated and surpassed his uncle's in elaborate lay-out.

Gabrosentum, see GATESHEAD.

Gabun, see GABON.

Gad, 7th son of Jacob by Zilpah, handmaid of Leah, and founder of the tribe. They settled E. of Jordan close to the tribe of Reuben, their ter. including Gilead. They were noted for their bravery; 11 of the tribe of G. came to help David when he most needed it. G. is also the name of a seer of King David, as well as of the god of luck or fortune. Isaiah lrv. 11 (R.V.).

Gad-flies, dipterous insects of the family Tabanidae. The females have mouth-parts adapted for piercing.

Gadag, tn of Bombay State, India, some 450 m. S. of Bombay. G. is an old tn. and has fine temples of both Vishnu and Shiva. It is also a great cotton centre.

Gadames, or Ghadames, tn and oasis in

Libya, North Africa, situated on the N. border of the Sahara, about 300 m. from Tripoli at the intersection of the frontiers of Libya, Algeria, and Tunisia. G. had its origin from the hot spring which probably made the Romans visit it about 20 bc, when it was captured by Balbus and called Cydamus. It is important for its caravan trade, and its gardens produce apricots, dates, and figs. The inhab. are chiefly Arabs and Berbers. Captured by Gen. Le Clerc's expeditionary force on 26 Jan. 1943 (see FREZZAN). G. is the mysterious city, the citadel of Islam, into which no white man had succeeded in penetrating before the beginning of this century, and for the first 4 decades few ventured to go there. The marquis de Morès, a coeval of Pétaïn (q.v.) at St Cyr, was murdered there by fanatical Muslims. The white fathers who had tried to catechise the natives of G. had been assassinated one after the other. Pop. 7000.

Gadara, anct tn of Syria, situated to the SE. of the sea of Galilee, and a member of the Decapolis (q.v.). Originally a Gk city, it is said to have been captured by Antiochus of Syria in 218 bc. Some years later it was besieged and partly destroyed by Jannaeus, but it was restored by Pompey about 63 bc. It is now in ruins. Its coins bear Gk legends and inscriptions, from which fact it is probable that the wealthy classes were Greeks. G. was famous for its hot sulphur springs which still exist.

Gaddi, It. family of artists:

Gaddo Gaddi (c. 1260-1332), painter, b. Florence. He was a friend of Cimabue, whose influence is seen in the 'Coronation of the Virgin with Saints and Angels,' a mosaic in the cathedral at Florence said to have been executed by him. Other works assigned to him are the mosaics in Santa Maria Maggiore, and those in the choir of old St Peter's at Rome.

Taddeo Gaddi (c. 1300-66), son of the former and a student of Giotto, also b. Florence. He painted in fresco the 'Virgin and Child between Four Prophets' in the Baroncelli Chapel in Santa Croce at Florence, as well as 'Scenes from the Life of the Virgin,' besides other frescoes at Pisa, Naples, and Berlin. He is considered one of Giotto's most important followers.

Agnolo Gaddi (active 1369, d. 1396), son of Taddeo and also a follower of Giotto, b. Florence and studied under Giovanni da Milano and Jacopo del Casentino. In 1369 he worked in the Vatican, probably with his brother Giovanni. He painted a series of frescoes in Prato Cathedral, representing the 2 legends of the Virgin and the Sacred Girdle (these are still to be seen, though much damaged), and the legend of the Cross, a work in the choir of Santa Croce, Florence, consisting of 8 frescoes.

See Vasari's *Lives of the Painters*.

Gaddir, see CADIZ.

Gade, Niels Vilhelm (1817-90), Dan. composer, was b. Copenhagen. His vture, *Echoes of Ossian*, 1840, first brought

him before the public; the composition was well received, and the king gave him a stipend which enabled him to go to Leipzig. There he became acquainted with Mendelssohn, and on his death in 1847 took over the Gewandhaus concerts. In 1848 he returned to Copenhagen, in 1850 became conductor of the Musical Society, and in 1866, with the composer J. P. E. Hartmann, he founded the musical conservatorium. His compositions include orchestral music, e.g. 8 symphonies, cantatas, e.g. *The Elf-King's Daughter*, *Psyche*, *Spring Message*, *Spring Fantasy*, pieces for the piano, and chamber music. See lives by W. Neumann, 1857, and W. Behrend (*Minder om Gade*), 1930.

Gadidae, family of teleost fishes allied to the hakes and placed in the order Anacanthini. The codfish, or *Gadus*, is a member of this family. Others are the haddock and the whiting, both of which form valuable foods.

Gadolinium, metallic element of atomic number 64 and atomic weight 157.3. It belongs to the group of rare-earth metals, from which it may be isolated by the fractional crystallisation of their nitrates and bromates. Its salts are colourless and it forms a white oxide. Its symbol is Gd.

Gads Hill, short distance outside the city of Rochester. It forms the scene of the adventures of Falstaff and Prince Henry, as depicted in Shakespeare's *Henry IV*. It is of more recent interest as the residence of Charles Dickens. He had always coveted the house known as G. H. Place, and purchased it in 1856. He lived here between 1860 and his death in 1870.

Gadsden, James (1788-1858), Amer. diplomat, b. Charleston, South Carolina. He fought in the war of 1812, also with Stonewall Jackson against the Seminole Indians. He afterwards became Amer. minister in Mexico and purchased by treaty in that capacity part of the states of Arizona and New Mexico, a tract known as the G. Purchase.

Gadsden: 1. Co. in the N. of Florida, U.S.A., in an agric. area (corn, peanuts, tobacco, vegetables, dairy products, poultry, hogs). It manufs. food products, cigars, naval stores, lumber, and bricks. Pop. 36,460.

2. Tn in Alabama, U.S.A., cap. of Etowah co. It is 60 m. NE. of the tn of Birmingham, and has cotton manufs., blast furnaces, and pipe works. Pop. 55,700.

Gadwall, species of duck (*Anas strepera*). It is practically unknown in Britain, although it has been known to exist in the marshes of Norfolk. It is, however, found practically all over the world, existing in North Africa, Asia, America, and in all parts of Europe. It is much esteemed as a table luxury, and is for that purpose imported in large quantities into Britain. In size it is not quite so large as the mallard, and it is a fresh-water bird. It breeds principally in marshy dists.

Gaea, or **Gē** (Rom. *Tellus*), the earth-goddess, daughter of Chaos, and mother of

Uranus and Pontus (Earth and Sea), mother also of the Titans and the Cyclopes. She was one of the deities presiding over death, Hades, and marriage. Her cult was extensive in the E., and she was worshipped originally at Delphi and Olympia.

Gaskwar, title of a powerful Mahratta prince, ruler of the former state of Baroda in W. India. In 1948-9 the G. agreed to the merging of Baroda in Bombay.

Gaelic Football, see FOOTBALL.

Gaelic Language and Literature, see CELTIC LANGUAGES; IRISH LANGUAGE AND LITERATURE; SCOTTISH GAELIC LANGUAGE AND LITERATURE.

Gaertnera, genus of Rubiaceae. It is common to the tropical dists. of Africa and Asia; some of the species are cultivated for their fragrant blossoms. Of these *G. racemosa* is one of the best known.

Gasta (anc. Caieta), It. fortified seaport, in Lazio (q.v.), 40 m. SE. of Latina (q.v.). It stands on a high promontory in the Gulf of G., an inlet of the Tyrrhenian Sea (q.v.). In 1861 it was the scene of the last stand of the reigning prince of Naples against united Italy (see ITALY, History). The archiepiscopal cathedral and other anc. buildings were damaged during the Second World War. G. has one of the best harbours in Italy, and has a glass industry and a trade in fish. Pop. (com.) 20,000.

Gastulia, name given in classical times to the region immediately S. of Numidia and Mauretania in North Africa. The country was inhab. by a Libyan race who are probably the ancestors of the modern Berbers. They were conquered and made part of the empire by the Romans at the beginning of the Christian era.

Gage, Thomas (1721-87), gen., son of the 1st Viscount G. Served in the Seven Years War, and, in 1755, in Braddock's ill-fated Amer. expedition. In 1760 he was appointed military governor in Montreal, and in 1763 commander-in-chief of the Brit. forces in America. As governor of Massachusetts he precipitated the revolution by his ill-timed severity, and, after the battle of Bunker's Hill, he was recalled to England. See C. E. Carter (ed.), *The Correspondence of Gen. Thomas Gage*, 1931-3; J. R. Alden, *General Gage in America*, 1948.

Gage, see GAUGE.

Gagetown, Camp, see OROMOCTO.

Gahanbars, the 6 ann. Parsee festivals each of which lasts for 5 days.

Gahnite, ore of zinc belonging to the class known as spinels. It varies in composition, and may contain sev. elements other than zinc. Part of the zinc may be replaced by iron or magnesium. The general formula may be given as (ZnFeMg)(AlFe)O₄.

Gaiety Theatre, London, opened in Dec. 1868 by John Hollingshead. The first productions were *On the Cards* by F. C. Burnand and *Robert the Devil* by Gilbert. Its famous stars included Nellie Farren and Fred Leslie. Musical comedy was first seen there in 1894 with the production of *The Shop Girl*. The first G. T. had

to be pulled down to allow for the making of Aldwych, and the new building, designed by the famous Eng. architect Norman Shaw, was opened in 1903 with George Edwardes's *Orchid*. Among other productions which appeared at this theatre were *The Spring Chicken*, *The New Aladdin*, *The Girls of Gottenburg*, and *Our Miss Gibbs*. The G. T. was in the Strand, at the W. end of Aldwych; it was closed down in 1939 because of suggested road improvements which never materialised because of the outbreak of war. It did not reopen, and was demolished in 1957.

Gaillac, Fr. tn in the dept of Tarn, on the Tarn. It grew up around a 10th-cent. Benedictine abbey, and has many old buildings. There is a large trade in white wines. Pop. 8500.

Gaillard, Félix (1919-), Fr. politician. An economist, he entered politics as a Radical after the Second World War. He became Fr. Premier on 5 Nov. 1957, succeeding Bourges-Maunoury (q.v.). He was the youngest man ever to hold the Fr. premiership, and succeeded to a situation of acute financial crisis.

Gaillardia, genus of ann. or perennial herbs, sometimes called blanket flowers, family Compositae, about 12 species, native to America. *G. pulchella* is the chief parent of ann. G.s, *G. aristata* of perennial G.s, grown in gardens.

Gainesville: 1. City of Florida, U.S.A., and co. seat of Alachua co. It is a rail junction and a processing and shipping centre for lumber, boxes, naval stores, concrete blocks, tung oil, and vegetables. It is a well-known winter resort, and is the seat of the univ. of Florida. Pop. 28,860.

2. City of Texas, U.S.A., situated in Cooke co. It is a great industrial centre and manufs. cotton-seed oil, flour, and iron-ware. Pop. 11,250.

3. Tn of Georgia, U.S.A., in Hall co. It is a textile-manufacturing and poultry-processing centre; surgical gauze, tobacco, chairs, harness, and lumber are also produced. G. is a popular summer health resort, with mineral springs. It is the seat of the Brenau College. Pop. 11,940.

Gainsborough, Thomas (1727-88), portrait and landscape painter, b. Sudbury, Suffolk, where he received small schooling, but where, by the age of 10, he had 'sketched every fine tree and picturesque cottage.' At 14 he went to London, studied etching under Gravelot and painting under Hayman. At 19 he married a young lady with £200 a year, and started housekeeping in Ipswich, where he remained till he moved to Bath in 1759. His studio soon became a resort of wealth and fashion, and among his sitters at this period were Richardson and Sterne, the novelists, and Garrick, whom G. regarded as 'the greatest creature living.' Moreover, he patronised musicians of every nationality, himself tried to play the harp, hautboy, and viol-da-gamba, and was a welcome *habitué* at the green-room of Palmer's Theatre. In 1768 G. was chosen one of the 36 foundation members of the Royal Academy, and was

a regular contributor at its exhibitions until 1784, when he virtually retired because in his opinion 'The King's Daughters' had been unfavourably hung. In 1774, at the height of his fame, he removed to London, where he paid £300 for his share of Schomberg House, Pall Mall. Here he painted a number of the great people of the day, among them Dr Johnson, Clive, Franklin, Sheridan, Canning, Burke, Lady Mary Montagu, and Mrs Siddons, whose portrait is still one of the treasures of the National Gallery. His death was due to a cancer which rapidly developed after a chill caught whilst attending the trial of Warren



E.N.A.

THOMAS GAINSBOROUGH
Self-portrait

Hastings. At the last he was reconciled with Reynolds, his rival and former friend, who came to him on his deathbed and who was dismissed with the words: 'We are all going to heaven, and van Dyck is of the company.'

It was Reynolds who generously and truly prophesied that, with the growth of an Eng. school, 'the name of Gainsborough will be transmitted to posterity as one of the very first of that rising name.' As a portrait painter he vied with Reynolds, and in landscape, realistic or imagined, he was original and a pioneer of later development. In his earlier works he faithfully reproduced the local character of the Suffolk landscape, but in his London years his landscapes became, as Ruskin remarked, 'rather motives of feeling and colour than earnest studies.' Whilst Richard Wilson looked back to Claude for much of his inspiration, G. sought always, as in his 'Waggon and Horses Passing a Brook,' 'The Cottage Door,' and 'The Market Cart,' to give an individual and

personal rendering of what he saw, though he was influenced by Dutch and Flem. painters. His portraits, such as 'Orpin, the Parish Clerk' and 'Master Buttail' (the Blue Boy), invariably graceful and often expressive to a high degree of a passing phase or gesture, have all the merits of instinctive genius without any of the laborious finish conventional in this branch of art. His lightning speed helped to secure a good likeness, and his free touch did not merit Reynolds's censure. Such is the exquisite blend of shining draperies with backgrounds of soft cloud-girt skies and feathery trees of spraying, lightly touched foliage; such is the solemn grandeur produced by the glow and richness of his colours and the transparency of his shadows, that even his least scholarly portraits are justly deemed masterpieces. His free compositions, like the late 'Diana and Actaeon' have risen in modern esteem. See A. Cunningham, *Lives of the Painters*, 1829-33; lives by Lord R. Gower, 1903; J. Greig, 1909; W. T. Whitley, 1915; E. R. Dibdin, 1923; and Mary Woodall, 1949.

Gainsborough, mkt tn of Lincs, England, situated on the R. Trent, about 15 m. NW. of Lincoln. Its chief industries are shipbuilding, engineering, and the manuf. of agric. implements, also oil, linseed cake, and malt, joinery, and flour milling. The tn has a very fine bridge and a manor house built by Sir Thomas Burgh, c. 1480. Pop. 17,509.

Gairdner, James (1828-1912), historian, b. Edinb. He entered the Public Record Office when a boy, and afterwards became assistant keeper. He ed. a considerable number of historical works, and contributed much to modern historical literature. His publs. on the early Tudor period are still considered standard authorities. Among the works which G. ed. are *Memorials of King Henry the Seventh*, 1858, *Letters and Papers of the Reigns of Richard III and Henry VII*, 1861, *The Paston Letters*, 1872-5, and *Letters and Papers of the Reign of Henry VIII*, 1880-1910. His other works include *Richard III*, 1878, *Studies in English History* (with James Spedding), 1881, *A History of the English Church*, 1902, and *Lollardy and the Reformation in England*, 1908.

Gairloch, coastal vil. in Ross and Cromarty, Scotland, 59 m. W. of Dingwall, a herring and ood fishing centre, with salmon and trout fishing also. G. is a stronghold of Gaelic culture. Pop. 2000.

Gaitskell, Hugh Todd Naylor (1906-), Brit. politician, educ. at Winchester and New College, Oxford. He had a distinguished academic career and subsequently lectured on political economics at London Univ. In 1945 he became Labour M.P. for South Leeds. From 1947 to 1950 he was minister of fuel and power; minister of state, 1950; and chancellor of the exchequer, 1950-1. His rise within his party since 1951 has been extremely rapid, and in 1954 he was elected its treasurer. He became leader

of the parl. Labour party in 1955, in succession to Attlee (q.v.), and, therefore, leader of the Opposition in the House of Commons. G. has done much to reconcile the varying factors within his party and to prepare it for the next general election.

Gaius, or **Caius**, Rom. jurist and one of the 5 great luminaries of Rom. jurisprudence, the others being Papinian, Paul, Ulpian, and Modestinus. Probably b. in the time of Hadrian, and fl. during the 2nd Christian cent., writing under the Antonines. Nothing is known of his personal hist., although he himself tells us that he was an adherent of the Sabinian school (see CAPITO). G. composed, besides other works he is known or believed to have written, a treatise on the *edictum provinciale*—i.e. the edict of the proconsul in the provs.—and a commentary on the Twelve Tables (q.v.). But the work by which he is known to all law students is his *Institutiones*, and the discovery of the MS. of this work by Niebuhr in 1816 has very greatly contributed to our knowledge of Rom. law. The MS. had been written over with the letters of St Jerome, and its very existence was all but unsuspected until Niebuhr found it while examining the contents of the library of the chapter at Verona. The work formed the basis of the Institutes of Justinian (q.v.), who has followed the order in which G. treats his subject, and adopted his exposition of law, so far as it was applicable to the times in which Justinian's Institutes were composed. The work of G. affords a valuable comparative study, showing where the law changed between the 2 periods, and so enables us to understand what the law really was at the time when its system was most perfect. See the eds. by G. Poste (with Eng. trans., 1875); and G. Studemund and P. Krüger, 1923.

Galactose (formula $C_6H_{12}O_6$), one of the hexose sugars, isomeric with glucose (grape sugar) and fructose (laevulose or fruit sugar). G. exists in 3 forms, viz. inactive, dextro-, and laevo-rotatory. The dextro-modification is obtained, together with glucose, by the hydrolysis of milk-sugar. On reduction it yields the alcohol dulcitol, and on oxidation first galactonic acid and finally mucic acid. Melting point 166°.

Galago, name of a member of a sub-family of African and Asiatic lemurs (family Galaxiidae). The galagos or 'bush-babies' have long feet, long, bushy tails, and large ears. They are active tree climbers and are nocturnal, feeding on fruit, insects, eggs, and small birds.

Galahad, in the Arthurian romances the son of Lancelot and Elaine. In the cycle of legend he is the model of ideal knight-hood and purity. He sets out on the quest of the Holy Grail, and on his journey redresses all grievances that cross his path.

Galanga, or **Galangal** (Chinese *Kao*, name of a prov., *liang*, mild, and *kiang*, ginger), old name given to *Alpinia*, a genus of plants belonging to the Zingiberaceae, the most important species

being *Alpinia officinarum*, a native of S. China. The roots and stems of this plant possess aromatic, stimulating properties similar to those of ginger, and are widely used in E. pharmacy.

Galanthus, see SNOWDROP.

Galápagos Islands, of volcanic formation, lie on the equator, 600 m. W. of the coast of the South Amer. state of Ecuador, of which the group is a prov. It takes its name from the enormous land tortoises originally found there in great numbers. The land area is 2966 sq. m. There is 1 large is., 4 fairly large, and 10 smaller ones, with innumerable islets and rocks. Darwin (in *Volcanic Islands*) estimated the number of extinct volcanoes at 2000. Discovered in 1535 by Fray Tomas de Balanga, 3rd bishop of Panama, the is. soon became a favourite resort of Brit. buccaneers who made forays on the Sp. Main, which accounts for the fact that the individual is. all have Eng. as well as Sp. names. The cap. of the group is Progreso, on Chatham Is., where live the military governor and more than 400 inhab. The climate is dry, and tempered by the cool Peruvian current. Owing to their position and isolation, the G. I. have a fauna and flora peculiar to themselves, and are of special interest to scientists. Sugar-cane, cotton, grain, and fruits are the main crops. Exports are hides, sugar, rum, and orchilla moss. Pop. in 1854 was 1350.

Galashiels, burgh of Selkirkshire, Scotland, 32 m. S. of Edinburgh. The chief industry is the manuf. of Scotch tweeds. The Scottish Woollen Technical College, within the tn, is the H.Q. of the country's tweed manuf. The residence of Sir Walter Scott, Abbotsford, is just outside the tn. Pop. 12,500.

Galata, suburb of Istanbul, situated at the S. end of the Bosphorus. Here are found banking houses and shipping agencies. There is also a lighthouse.

Galatea: 1. Sea-nymph, daughter of Nereus and Doris, see ACIS.

2. An ivory statue endowed with life by Aphrodite at the prayer of the sculptor Pygmalion (q.v.).

Galati, or **Galatz**, tn in Rumania, important as a port and as the seat of a bishop. It is situated on the l. b. of the Danube. It is the seat of the Rumanian 3rd Army Corps and the naval school, the International Danubian Commission and the chief Danube shipping companies, and 3 chambers of commerce. It is an important industrial tn and among its chief industries are the manuf. of candles, soap, wire, nails, buttons, chemical products, iron, and copper. It possesses saw-mills, paste-mills, flour-mills, roperies, and petroleum refineries. It is the chief port of entry for the overseas trade of the Danube and the chief port for the export of timber. Other exports are maize, wheat, barley, rye, and flour. The rapid growth of the tn is due to the opening up of the Danube carrying trade. It has been the scene of 2 engagements between Turks and Russians. In the Second World War it was captured by the

Russians on 27 Aug. 1944 (see further under EASTERN FRONT, or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR). Pop. (1948) 80,000.

Galatia, an ant. dist. of Asia Minor. The name is derived from the Gauls who invaded and settled in that part of the peninsular about the 3rd cent. BC. It was included in the Rom. Empire and under Augustus became a Rom. prov. St Paul's Epistle to the Galatians was addressed to Jewish converts of this area.

Galatians, St Paul's Epistle to the, undoubtedly written by St Paul, probably composed at Ephesus either about AD 49 while Paul was on his way to the Council of Jerusalem (if Gal. ii. 1-10 refers to his second visit to Jerusalem recorded in Acts xi. 29-30), or after that Council (when it is difficult to account for the silence about the decisions taken at it). Ramsay, in his *Historical Commentary*, 1900, showed that in the time of Paul, Galatia stretched right across Asia Minor, and so the Epistle may well be addressed to the converts of the first missionary journey (c. 45-9). The Epistle, which 'reads like a dithyramb from beginning to end,' was a passionate outburst, containing, strangely enough, no word of praise or greetings. The letter is divided into a vindication of his mission and apostolic independence, an inspired exposition of how Christianity had superseded the Mosaic law, a panegyric of faith as the mark of the true 'son of Abraham,' and finally a fervid plea for the superiority of Christianity to legalism as the 'free and final religion.' The whole style of the epistle, which has been described as 'a veritable torrent of genuine and inimitable Paulinism,' is in very strong contrast to the calm and measured exposition of the later Epistle to the Romans, which deals with the same issue; but it is inferred from the Epistle to the Romans, as well as from 1 Cor. (also written after G.), that the Christians in Galatia had then been won back to St Paul and his gospel. G. is something more than a writing dealing with a controversy of bygone days; it is for all time the charter of Christian freedom. See commentaries by J. B. Lightfoot, 1884; W. M. Ramsay, 1900; J. Lagrange, 1918.

Galatz, see GALATI.

Galaxy, or **Milky Way** (from Gk *gala*, milk), name of a splendid luminous belt of many thousands of millions of stars, which may be seen, on a clear night, stretching in a great arc from horizon to horizon. It surrounds the whole earth in what is almost a great circle, and is inclined to the celestial (or terrestrial) equator at an angle of about 65 degrees. For some 150 degrees the zone spreads out into 2 branches—one shining, the other dull and disconnected—which eventually reunite. To the naked eye the stars are merged together in one broad stream of light.

Galba, **Servius Sulpicius** (5 BC to AD 69), Rom. emperor, became consul in AD 33, and under Nero showed courage, force

and equity in the administration of Aquitania, Africa, and Hispania Tarraconensis. With the help of Vindex, Otho, and the praetorian guard, he became emperor on Nero's death in AD 68. But no sooner was he fully instated than he lost all his popularity and became an object of hatred because of his extreme avarice, the extortions of his favourites, to whom he surrendered the reins of power, and his refusal to pay the soldiers the promised rewards. In AD 69 Otho led a successful mutiny, ordered the assassination of G., and succeeded him on the imperial throne.

Galbanum, gum-resin obtained from *Ferula galbaniflua* and *F. rubricaulis*, 2 species of Umbelliferae. It has been used medicinally as an antispasmodic expectorant, and external rubefacient.

Galdós, Benito Pérez (1842-1920), Sp. novelist, b. Las Palmas, Canary Is. He was educ. at Madrid, where he worked for 7 years as a journalist, afterwards devoting himself to writing novels until a few years before his death, when he became blind. G. was a most prolific writer, and his great collection of works comprises 2 series of Sp. national historical episodes, contemporary Sp. novels, dramas, and miscellaneous works. He first made a name with his historical novel *La Fontana de Oro*, 1870, and many of his books have been trans. into Eng., amongst these being *The Perfect Lady*, *Trafalgar*, *Leon Roch*, and *Martanella*. Since the time of Cervantes, G. was the writer who most influenced the Sp. mind. He was a member of the Royal Academy of the Sp. Tongue, and sat in Parliament on sev. occasions as a Republican member. The occasion in which he was held was shown at his funeral, there being an attendance of members of all the academies, members of the gov., the whole of the Madrid tn council and prov. deputies; while the official *Gazette* announced a decree of the gov. offering to pay all the expenses of the funeral of 'Spain's greatest writer since Cervantes.' Many of his theatrical works have been played both in Spain and in other countries, the best known being *Electra*, 1900, and *Casandra*, 1905. See L. B. Walton, *Pérez Galdós and the Spanish Novel of the Nineteenth Century*, 1927.

Gale, Norman Rowland (1862-1942), poet, b. Kew, Surrey. His vols. of verse include *A Country Muse*, 1892, *Orchard Songs*, 1894, *A Book of Quatrains*, 1909, *The Candid Cuckoo*, 1918, *Verses in Bloom*, 1925, and *Love-in-a-Mist*, 1939. He also pub. some books of verse about cricket.

Gale, Thomas (c. 1636-1702), antiquary and an eminent scholar. Became prof. of Greek at Cambridge in 1666 and fellow in 1669. Dean of York, 1697. He is noted for his eds. of a large series of Eng. chronicles, 1684-91, and of Gildas and Nennius.

Gale, Zona (1874-1938), Amer. novelist, b. Portage, Wisconsin. Educ. at the univ. of Wisconsin, she became a journalist. Her novels include *Romance Island*, 1906, *Heart's Kindred*, 1915, *A Daughter*

of To-morrow, 1917, *Birth*, 1918, *Miss Lulu Beth*, 1920, which was dramatised and awarded the Pulitzer prize, *Faint Perfume*, 1923, *Preface to a Life*, 1926, *Borgia*, 1929, *Papa le Fleur*, 1933, and *Light Woman*, 1937. *When I Was a Little Girl*, 1913, and *Portage, Wisconsin*, 1928, are autobiographical. In 1928 she married W. L. Breece. See A. Derleth, *Still Small Voice*, 1940.

Gale, see STORM.

Gale, Sweet, see BOG MYRTLE.

Galen, or **Galenus** (c. AD 130-201), Gk physician, b. Pergamos in Mysia, Asia Minor. For centuries he was in error called Claudius Galen, due to misinterpretation of the prefix Cl. (clarissimus) often used with his name. He studied medicine at Pergamos, Corinth, and Alexandria. He then went to Rome where he later became physician to the emperor M. Aurelius. He also attended the emperors Commodus and Severus. He is supposed to have d. in Sicily. Next to Hippocrates, Galen is the greatest physician of all time. No one before or since has exercised so great an influence on medical hist. He was the most prolific of the anc. writers on medicine; he wrote about 130 books, of which 83 survive (about 2½ million words); he was also the author of 125 books on philosophy, law, mathematics, and grammar. His dogmatism and dialectic skill impressed those who came after him and for 15 centuries his works, which formed the foundations of anatomy and physiology, were authoritative. No great anatomist followed him until Vesalius (1514-64) and no great physiologist until W. Harvey (1578-1657). G.'s humoral theory of disease was until the Renaissance the very foundation of all medical thought. His works were first printed (in Greek) at Venice, 1525; the most important ed. is that ed. by J. L. Kühn, with Gk and Lat. text, 20 vols., Leipzig, 1821-33. J. Walsh has pub. sev. papers on G. and his writings in the *Annals of Medical History*, 1927-39.

Galen, Clemens August, Count von (1878-1946), Ger. prelate, b. Dinklage of a noble family. In 1933 he became bishop of Munster, and as a leader of the Rom. Catholic Church was an outspoken critic of National Socialism, especially during the Second World War. He was made cardinal in Mar. 1946, but d. of exhaustion soon after his return from Rome in the same month.

Galena, city, cap. of Jo Daviess co., Illinois, U.S.A., on G. R., near the Mississippi in the NW. of the state. It is the centre of a dairying and lead and zinc mining area. G. was the home of President Grant. Pop. 4600.

Galena, or **Lead-glance**, the naturally occurring sulphide of lead (PbS) which constitutes the chief source of the metal. G. is found widely distributed in the form of cubic crystals of a lead-grey colour (sp. gr. 7.5; hardness, 2.5), occurring chiefly in veins in the carboniferous deposits, and often accompanying other metallic ores. G. is easily oxidised, and the metal

is readily obtained by reduction. Some specimens contain so much silver that the separation of that metal is profitably carried on. See LEAD.

Galeopithecus, name given to a genus of the mammalian order Dermoptera, a group which is sometimes included among the Insectivora. They inhabit the forests of the Philippine Is., flying from tree to tree by means of the patagium, or parachute-like membrane; when at rest they hang by their posterior limbs, head downwards, after the manner of bats. They are about the size of cats and are nocturnal animals. There is one species, *G. volans*. *Galeopterus temminckii*, the other species of 'flying lemur', is found in Malaysia.

Galerius (*Galerius* *Valerius* Maximianus, sometimes referred to as Maximianus II), Rom. emperor (AD 305-11), b. of humble parentage in Thrace. He served in the wars of Aurelian and Probus, and eventually married Diocletian's daughter. In 293 Diocletian conferred upon him the title of Caesar with jurisdiction over Illyricum and the Danubian region. On the abdication of Diocletian and Maximianus I in 305, G. attained the rank of Augustus. He was defeated by Maxentius (q.v.) in 307, losing Italy and Africa. G.'s name is associated with the persecution of Christians under Diocletian.

Galesburg, city, cap. of Knox co., Illinois, U.S.A., a railway centre and livestock market, near coal mines and clay and gravel pits. G. manufactures iron and steel products, farm implements, clothing, etc. It was an Underground Railroad (q.v.) 'station'; one of the Lincoln-Douglas debates was held here. G. is the seat of Knox College. Pop. 31,400.

Galgacus, Caledonian chieftain who organised the bitter resistance offered about AD 85 to the Rom. invaders under Gnaeus Julius Agricola. He was finally defeated at the battle of Mons Graupius.

Galiani, Ferdinando (1728-87), It. political economist, pub. in 1750 his *Della Moneta*, a revolutionary description of coin or currency. He maintained that money, being merchandise, must not be restricted, either as regards interest or value, a doctrine at once adopted into the practice of his native city, Naples. In the later ed. of 1780 he enlarged on the intrinsic value of the precious metals, and on their suitability as media of exchange. See A. Margheri, *L'Abbate Galiani*, 1878.

Galicus (Ukrainian *Halych*, Polish *Halicz*), small tn in the Stanislaw Oblast of Galicia (q.v.), 70 m. SE. of L'vov. It has the ruins of a castle and sev. medieval churches. In the 11th-13th cents. it was cap. of G. principality and the kingdom of Galicia and Volhynia (q.v.). In 1340 it became Polish, in 1772 Austrian. It was the scene of bitter fighting in 1914. From 1919 to 1939 it was Polish.

Galicia: 1. Region in NW. Spain, comprising the provs. of La Coruña, Lugo, Orense, and Pontevedra (qq.v.). Occupied at one time by Phoenicians and Gauls, it became a Gothic kingdom in the 6th cent. Later it was one of the chief

centres of Sp. resistance to the Moors. It is a high plateau, containing ridges of the Cantabrian Mts, and is traversed NE.-SW. by the Miño (q.v.). The deep floods along the indented coast afford splendid anchorages, the chief harbours being La Coruña, El Ferrol, and Vigo (qq.v.). Livestock, vegetables, fish, tin, and tungsten are the prin. products. The Gallegos are a hardy race, and their language, allied to Portuguese, is distinct from Castilian Spanish. The climate is very wet. Area 11,260 sq. m.; pop. 2,632,500.

2. Area in W. Ukraine comprising L'vov, Droghobych, Stanislaw, and Ternopol' Oblasts; it embraces the N. slopes of the Carpathian Mts in the S., and the Volhynia-Podolia upland in the N. It belonged to the Kievan state (see KIEVAN RUSSIA), was independent after 1152, fused with Volhynia (q.v.), 1199-1340 (see GALICIA AND VOLHYNIA, KINGDOM OF), and became Polish in 1349; it was an Austrian crownland, 1772-1918, then again Polish, was annexed by the U.S.S.R. in 1939, and in 1941-4 was occupied by the Germans and included in the Gov. General (see POLAND, History). As an Austrian crownland G. included a part of Little Poland around Cracow.

Galicia, Campaign in (First World War). In the early months of the First World War the Russians attempted to break through to Germany via Bohemia, which necessitated an advance through G. In Sept. 1914 they swept over Tarnopol, Lemberg, and Przemyśl, but were arrested at the Carpathian Mts, which were strongly held by an Austro-Hungarian force which offered the stoutest resistance. In the spring of 1915 the Germans, under von Mackensen, broke through the important Gorlice pass and soon hurled the Russians back. Mackensen relieved Przemyśl at the commencement of June and Lemberg towards the end of the month. Brusilov (q.v.) commanded the Russians on this front, and as soon as he reorganised his force dealt the Austrians a severe blow SE. of Lemberg in Sept. 1915. He made another attack in the autumn of 1916, but the Russian Revolution brought all operations to a standstill. See also WORLD WAR, FIRST.

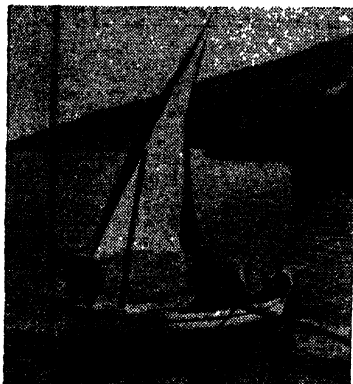
Galicia and Volhynia, Kingdom of, medieval state in E. Europe, consisting of the principalities of Galicia and Volhynia (q.v.), which in 1199 were fused into 1 principality whose prince received from the Pope the title of king in 1254. Volhynia became Lithuanian in 1340, Galicia Polish in 1349. K. of G. and V. (Lodomeria) was also the official name of Galicia as an Austrian crownland, 1772-1918.

Galignani, Giovanni Antonio (1796-1873), and Guglielmo (1798-1882), were 2 publishers in Paris, whose father, Giovanni Antonio G. (1752-1821), had immigrated from Italy. They continued to bring out the daily newspaper (written in Eng.) entitled *Galignani's Messenger*, which their father had founded in 1814.

In its columns they did what they could to establish cordial relations between England and France. Their connection with the paper was severed in 1884. A monument to their honour stands in Corbeil, where they built and endowed a hospital.

Galilaeans, fanatical sect led by a certain Judas of Galilee, who rebelled against the taxation census of AD 67 (Acts 7. 37; cf. Josephus, *Jewish War*, II, 8: 1).

Galilee: 1. (From Heb. *Gahil*, a border or ring), is rarely mentioned in the O.T., but some time after the return of the Jews from exile it was occupied by the Israelites, and rapidly developed a vigorous nationalism, so that G. became a tetrarchy under the Herods within the Rom.



E.N.A.

TIBERIAS ON THE SEA OF GALILEE

Empire. In the time of Christ, the prov. spread from the Mediterranean to the Jordan, embracing all N. Palestine. Upper G. is mountainous and well wooded, Lower G. fertile and flat. The chief cities were Sepphoris and Tiberias, though Capernaum, Nazareth, and Nain are more important in the gospel story. The inhab. were chiefly Syrians, Phoenicians, Arabs, Greeks, and Jews; to-day they are Muslims, Jews, Greeks, Christians, Arabs, Druses, and Maronites—but many Arabs, upon the Jewish invasion of 1948, fled to neighbouring Arab countries. The sea of G., called also the lake of Gennesaret, the sea of Tiberias, and the sea of Cinneroth, is an expansion of the Jordan, 680 ft below sea level, 13 m. long, and 8 m. broad. When Christ preached it was surrounded by prosperous villages, densely populated, but since those times and until very recent years it became almost a wilderness, and fertility seemed to have deserted its shores. The people of G., though in Judaea regarded as boorish provincials, whose Judaism was overlaid with despicable laxity and corruption,

were attractive for their very simplicity and happy, gentle dispositions.

The vegetation of Lake G. is subtropical. Lower G. has a less intensive agriculture than the plain of Esdraelon but resembles it in having 50 per cent of its ordinary crops, in the non-irrigated land, under cereals, and has proportionately less tubers, hay, and fruit, but more legumes. Its distinctive feature is its large area of olives and of fallow land. Upper G., on the other hand, has more of the intensiveness of the plains and more irrigated land, producing more deciduous fruit, especially grapes and apples, and more vegetables and green fodder. There are facilities for the repair of agric. machinery at the Ilon settlement in G. Kersenneh, beans and lentils are grown in Nazareth; chick-peas in Tiberias. In 1925 a new 102-kW. hydro-electric station was built at Tiberias. During the Second World War Tiberias had a lake airport for flying boats. There are hot springs at Tiberias, and parks, part of the development of the tourist trade by Jewish immigration. Nazareth, a purely Arab town until recently, is distinctive in Palestine in having stone buildings. It retains something of the period of the crusaders, with its Franciscan monks and their old gardens, and women clad in costumes embroidered in the style of the 12th cent. with earthenware jars on their heads. Amidst the hills of G. are hotels and sanatoria in the Jewish settlements, which offer hospitality to the visitor.

2. Architectural term for a porch or chapel attached to a church. Examples may still be seen at the W. end of the naves in Ely and Durham cathedrals, and on the W. side of the S. transept in Lincoln Cathedral. They were used sometimes as the part reserved for penitents, sometimes for corpses previous to interment, and at other times as the meeting ground for monks and their women relatives, who might not penetrate further into a monastic church.

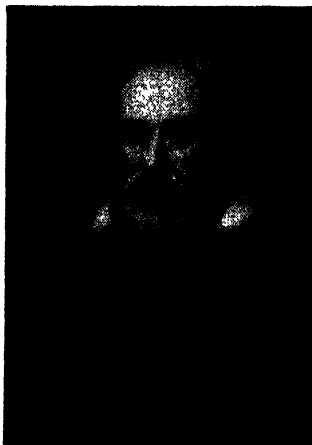
Galileo Galilei (1564–1642), It. experimental philosopher and astronomer, b. Pisa. In 1581 he entered the univ. there. At first he studied medicine, but early renounced this science in favour of experimental philosophy, finding a good friend in Guido Ubaldi, through whose good offices, G. eventually obtained, in 1589, a mathematical professorship in Pisa under the Grand Duke Ferdinand I de' Medici. It is stated (though the story may be apocryphal, like some others about him) that, having watched the swing of a bronze lamp in the Pisan cathedral, G. soon discovered the isochronism of pendulum oscillations; for he found that the range of the swing or oscillation had no effect on its duration. He tested his discovery by counting the beats of his pulse and comparing the number of pulsations with the time of the pendulum vibration, and at once saw the possibility of utilising his invention for chronometers. In his youth he also wrote a treatise on the sp. gr. of solid bodies and constructed a hydrostatic balance. His next vital

discovery was the equality of the velocities of all falling bodies great and small. Up to his time people had imagined that a body 6 times as heavy as another would fall through the same space in one-sixth the time. The story is often told about G. dropping the weights from the Leaning Tower of Pisa to disprove the current belief about falling bodies, but this story is now known to be apocryphal.

In 1592 G. accepted the chair of mathematics in Padua, as his revolutionary discoveries and still more his biting satire had made him many active enemies in Pisa. Here he worked till 1610, and among his numerous inventions were an imperfect species of thermometer and a proportional compass. He was the first to use the telescope for astronomical purposes. With his new appliance he revealed a series of startling and brilliant scientific facts. Never before his time had anyone declared that the Milky Way was, as Milton, who had visited G., stated, 'powdered with stars,' or that the moon, far from being a smooth and self-luminous sphere, was diversified with great mts and valleys, and lightened only by reflections of the sun's rays from the earth, or that the planet Jupiter had 4 satellites, or that Saturn had a triple aspect (due to its rings), or, finally, that the sun which the schoolmen had regarded as a symbol of perfection was, in reality, besmirched with spots. It is not generally appreciated by modern scientific thinkers what little prominence time had in pre-Galilean systems of philosophy. It was taken for granted as being practically identical with consciousness itself, thus calling for no special thought on its own account. The great achievement of G. was to create conceptions in terms of which motion could be treated mathematically, and to this end he represented time as a space-like dimension which could be measured—divided up into equal parts as a length is. But this dimension, or 'spacified' extension, of time was so conceived for the one purpose of making motion amenable to mathematical treatment. The world describable in terms of it was specifically limited by G. to the world of mechanical phenomena. All else—even physical experiences like heat, sounds, smells, colours, and the rest—he excluded from this world, and located in the perceiving being. It is difficult to overestimate the value of this achievement, for it has made possible the whole of modern physical science; and it is difficult also to overestimate the illusions it has created, for, having seen the value of the concept of 'spacified' time in mechanics, subsequent thinkers, less perspicacious than G., have taken it to be a universal receptacle for the whole of human experience, and therefore as representing in a more precise form everything that human consciousness has ever meant by time. Consequently the whole of experience has been distorted to fit a concept to which most of it is non-conformable (Herbert Dingle).

After 1610 he worked freely in Florence

under his new patron, Ferdinand II, to whom he dedicated, in 1632, his famous *Dialogue on the Ptolemaic and Copernican Systems*. Not content with showing that the latter adequately explained celestial movements, G. threw himself into theological controversy by trying to explain the congruity or incongruity of certain biblical texts read in the light of his theory. His interpretations ran counter to the accepted opinion, and already in 1616, though not condemned by name, he had been compelled by the Rom. Inquisition not to assert 'what seemed to contradict Scripture.' His 1634 pub. therefore was taken by the Rom. authori-



GALILEO GALILEI

Engraving from a picture by Allan Ramsay in Trinity College, Cambridge

ties under his former patron Urban VIII as a direct challenge. He was summoned to Rome, where he was obliged solemnly to abjure his 'heresies,' above all that of the diurnal and yearly motion of the earth and of the stability of the sun. He was further to recite the 7 Penitential Psalms once a week for 3 years, and was technically imprisoned, i.e. under observation, for the rest of his life. This sentence, however, though signed by 3 cardinals, did not receive papal ratification. The remark said to have been made to a friend—*Eppur si muove!* ('It moves for all that')—is apocryphal. Irascible, but forgiving by nature, G. loved the amenities of social life and was qualified by taste and knowledge to pass judgments in poetry, music, and painting. Torricelli, who was passionately attached to his master, is the most famous of his pupils. See F. R. Wegg-Prosser, *Galileo and his Judges*, 1889; and J. Fahle, *Scientific Works of Galileo*, 1921; F. S. Taylor, *Galileo and the Freedom of Thought*, 1938; Z.

Harsanyi, *Et Pourtant elle tourne: vie de Galileo*, 1947.

Galileo's Telescope, see OPERA GLASS.

Gallia, see KALISZ.

Gallium, see BEDSTRAWES.

Gall, St (d. c. 640), Irish monk of Bangor; disciple of St Columbanus (q.v.) whom he followed to the Continent. After St Columbanus's exile from France G. settled in Switzerland, of which he is considered one of the apostles and where his name was commemorated in the great abbey of St G. A Swiss canton and tn are also named after him. His feast is on 18 Oct.

Gall, Franz Joseph (c. 1757-1828), founder of the system of phrenology, was b. Tiefenbrunn, in Baden, Germany. He became physician in Vienna in 1785. Having studied exhaustively from boyhood the external manifestations on the cranium of the different powers of human mind and character, he eventually concluded that the talents and mental characteristics depended on the functions of the brain, and that these characteristics caused variations in the development of certain areas on the surface of the brain, which could be determined by careful study of the external surface of the skull. He began to lecture on this subject (phrenology) in 1796. Phrenology was exploited by quacks and charlatans and soon became a subject of derision among the medical profession, although many philosophers ranged themselves on G.'s side. His work stimulated others to study cerebral physiology and led to the localisation of certain activities in definite areas of the brain. Chief works (in collaboration with his pupil J. C. Spurzheim) were *Introduction au cours de physiologie du cerveau*, 1808, *Recherches sur le système nerveux*, 1809, and *Anatomie et physiologie du système nerveux* (4 vols.), 1810-19. See life by Jessie Fowler, 1896; and Dr B. Hollander, *In Search of the Soul*, 1920.

Gall, excrescence or tissue-body produced in plants by the presence of parasitic insects or fungi; G.s vary greatly in form, some of them being complicated structures resembling fruits and flowers. The so-called oak 'apples' and 'witches' brooms' are well-known examples. See GALL-FLY; OAK-GALL.

Gall, see BILE; GALL BLADDER.

Gall Bladder, pear-shaped membranous sac, 3 or 4 in. long and about 1½ in. across its widest part, and capable of containing 8 to 12 fluid drachms. It is lodged obliquely in a cleft in the concave lower surface of the right lobe of the liver (q.v.). Its large end or *fundus* projects beyond the anterior border of the liver and is directed forwards, downwards, and to the right. Its upper surface is attached to the liver by areolar tissue, its under surface and fundus are covered by the peritoneum, which is reflected over them from the surface of the liver. The neck gradually narrowing is curved S-shape, and then becomes much constricted and, changing its general direction, it bends downwards and terminates in the cystic duct. This

duct joins, at an acute angle, the single duct formed by the junction of the right and left hepatic ducts, and the common channel to all 3 is termed the *common bile duct* which runs down to the second part of the duodenum, into which it opens through the sphincter of Oddi. The chief function of the G. B. is to act as a reservoir for the secreted bile. The secretion of bile from the liver is continuous, unlike the other digestive secretions, which take place only during digestion and cease, more or less, during abstinence. But while the secretion of bile is continuous, its excretion or output into the duodenum is periodic, and coincides exactly with the period of digestion in which the acid chyme is spurted by rhythmical jets from the stomach to the intestine. It is therefore evident that the bile secreted during abstinence must all collect in the G. B., which, in short, is a lateral diverticulum of the excretory bile ducts, where the bile becomes condensed by absorption of water.

Experiments made by Oddi in 1887 resulted in the discovery of a special sphincter of plain muscle situated at the duodenal end of the common bile duct. The mechanism by which the flow of bile into the intestine is brought about consists in a reflex diminution in tone of this sphincter caused by the distension of the intestine and the entrance of the chyme from the stomach. It is therefore an inhibitory reflex discharged from a higher centre. Concretions of the solid matter of bile are liable to form calculi (q.v.) in the gall bladder or cystic duct. These are known as *gall stones*. If causing symptoms such as colic, and when they obstruct the passage of bile and give rise to jaundice, they must be removed surgically. *Cholecystitis*, inflammation of the G. B., may be acute, and may lead to suppuration (empyema, or abscess, of the G. B.), or may be chronic, in which case the walls of the G. B. become fibrous and thickened. Chronic cholecystitis is a predisposing cause of gall stones. Upper abdominal pain, flatulence, and dyspepsia are symptoms of cholecystitis.

Gall-midges, minute dipterous insects belonging to the family Cecidomyiidae, which live in the different parts of plants or under the bark of trees. Certain species of *Miastor* and *Oligarces* possess the remarkable power of reproduction whilst in the larval state. *Cecidomyia destructor*, the Hessian fly, is injurious to cereals, and is a great pest in some parts.

Gall-stones, Cholelithiasis, or Biliary Calculi. G. are found in the gall bladder and biliary ducts of man and most vertebrate animals, being especially common in oxen. Their size varies from that of small gravel to large stones quite 5 in. in length. When large the stones are usually found singly and of a rounded or oval shape. The smaller, wedge-shaped ones are generally more numerous. Their colour ranges from white to black, but is generally brown. Chemically they are a compound of lime and bile pigment,

with traces of mucous and phosphatic earths; the larger and lighter coloured stones are covered with cholesterol. *G.* are rare before puberty, and most common after 30 years of age. They are more common in women than men and tend to occur in fat rather than thin people. They are often associated with cholecystitis (see GALL BLADDER).

When the stones enter the bile passages, they give rise to biliary colic, that is to say, intense pain on the right side of the abdomen, below the ribs. This attack is followed by jaundice within 12 to 48 hrs. The pain usually lasts until the stone is passed out of the duct or falls back again into the gall bladder, which may take place in a few hrs or only after sev. days. The attacks may recur from time to time as new stones leave the bladder. There is no means of removing or 'dissolving' *G.* by medicinal treatment. A low fat diet helps to minimise the liability to attacks of biliary colic and jaundice, but if these recur frequently the gall bladder and the stones in it must be removed by operation. This operation is known as cholecystectomy.

Gall-wasps are small hymenopterous insects belonging to the family Cynipidae and related to the ants and bees; they are black and wasp-like in shape, with straight antennae. The presence of the larvae results in plant excrescences, or galls (q.v.), from which the insect emerges on reaching maturity. *Rhodites rosae* causes the bedeguar gall which is commonly found on wild rose-trees and also on the cultivated plant. The true gall-makers are called Psenides, and, in addition to the typical genus *Cynips*, include *Aphlotrix*, *Andricus*, *Neuroterus*. *C. gallatinctoriae* produces the gall-nuts of commerce, and *C. insana* produces those known as Dead Sea Apples or Apples of Sodom.

Gallait, Louis (1810-87), Belgian painter, was b. Tournai, where he studied art. He was of note in his own time as one of those who revived historical painting in Belgium, his huge 'Abdication of Charles V' being the best known.

Galland, Antoine (1646-1715), Fr. orientalist. In 1709 he became prof. of Arabic in the Collège de France. His chief work is his trans. of the *Arabian Nights* (3rd ed., 12 vols.), 1704-8, being the first trans. into a European language. He wrote also historical monographs and other works, and pub. translations of the Koran and of *Kalilah and Dimnah*.

Gallarate, It. tn., in Lombardy (q.v.), 11 m. S. of Varese (q.v.). It has cotton-spinning industry. Pop. (tn) 14,700; (com.) 29,700.

Gallarus Oratory, on the Dingle peninsula, Rep. of Ireland, a perfectly preserved 7th cent. church. It is built throughout of un-mortared stone and is completely watertight after over a thousand years' exposure to Atlantic gales.

Gallas, Matthias von, Count of Campo, Duke of Lucera (1584-1647), Austrian gen., distinguished in the Thirty Years War. He first served with the Spaniards in Savoy (1617), then with the army of the

Catholic League, and was major-general of the forces which captured Mantua (1629). He commanded under Wallenstein in Bohemia, fighting against the Swedes at Nuremberg and Lützen (1632). *G.* then intrigued against Wallenstein, and after the latter's assassination succeeded to his command, 1634, winning a notable victory at Nördlingen. Archduke Leopold superseded him (1638). *G.* was in command again in 1642, but was defeated by Torstenson at Magdeburg c. 1644. His army earned a reputation for cruelty, and the word marauder is derived from his *Marode Brüder*.

Gallas, African Hamitic tribe, racially closely allied to the Somalis. Their original home is uncertain, but was probably somewhere in the highland mass lying between the Ethiopian plateau proper and the Somali plain. Some believe that they came across the Red Sea from S. Arabia. From the 16th cent. onwards they have migrated in waves into the main plateau of Ethiopia, and occupied great parts of the S. highlands. It is largely owing to the Galla invasions that the aboriginals of the S. of Ethiopia have not been assimilated like those of the central highlands. The *G.* were pagans when they invaded the country, and for the most part remain so. Some Galla tribes, like the Wollo, have become fanatical Muslims. Others have received a faint tinge of Christianity. Much information on them has been gathered from the writings of Balthazar Telles, a Portuguese Jesuit, who incidentally disillusioned the world on the myth of Prester John. The *G.* number over 4,000,000. They have proved themselves quite as capable of being administrators as the Amharas, and many of the highest offices in the Imperial Gov. service are held by *G.* The emperor's confidence in their unequivocal loyalty is also evinced by the fact that many *G.* are commissioned in the Imperial Guard, the army, and the air force. These posts are in no way restricted to Christians, and many Muslim *G.* are so employed.

Gallatin, Albert (1761-1849), Swiss-Amer. financier and statesman, b. Geneva. He emigrated to the U.S.A., 1780, and, unsuccessful in trade, supported himself for some time by teaching Fr. at Harvard College. Elected to the U.S. Senate (1793), he was deprived of his seat on the ground of ineligibility. He then entered the House of Representatives (1796). It was as secretary of the treasury (1801-13) that he first proved himself a great financier. He was mainly responsible for the favourable conclusion of peace negotiations with England in 1814, and himself signed the treaty of Ghent. After filling important diplomatic positions in Paris and London he returned to New York, and retired from public life (1827).

Gallatin, riv. rising in Wyoming, U.S.A., and flowing 120 m. N., forming deep canyons between Madison and G. ranges in SW. Montana, to a point NE. of Three Forks, where it joins Madison and Jefferson

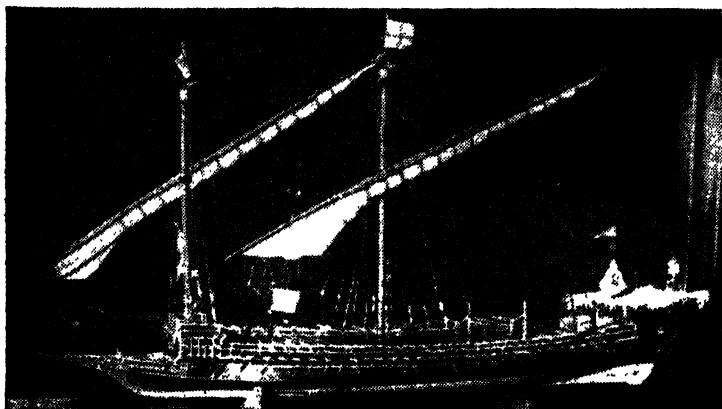
G.s to form the Missouri. It is used for irrigation.

Gallaudet, Thomas Hopkins (1787-1851), Amer. teacher of the deaf and dumb. He was b. at Philadelphia, and took his degree at Yale. He afterwards became a student of theology at Andover, Massachusetts, and after having obtained, in 1814, a licence to preach visited Europe with a view to teaching the deaf and dumb. He studied in Paris under the Abbé Sicard, and in 1816, on his return to America, founded a school for deaf mutes at Hartford, being the head of it until 1830. He wrote sev. works, among them *The Child's Book on the Soul*, 1832,

since the great development of Colombo harbour.

Galleon (Sp. *galeon*), large ship used by Sp. merchants in the 15th-18th cents. to convey gold and silver from Mexico and Peru to Spain. The ships, which were armed, possessed 3 or 4 decks.

Gallery means a long and narrow passage raised above the ordinary floor of a room. These G.s are often to be seen in churches, as in the case of the rood-loft, which is a G. forming a means of support and elevation for the rood or cross; in Norman castles the great hall often had a G. surrounding it. The great halls of old mansions were provided with a minstrels'



By courtesy of the Italian State Tourist Office

MODEL OF GENOESSE GALLEY IN CEREMONIAL RIG (16TH CENTURY)

Civil Naval Museum, Genoa

and *The Youth's Book on Natural Theology*, 1832.

Galle, Johann Gottfried (1812-1910), Ger. astronomer, b. Pabsthaus, near Wittenberg. He was the first to observe the planet Neptune (25 Sept. 1846), the existence of which had previously been proved by the calculations of the Fr. astronomer, U. J. J. Leverrier (q.v.), and the Eng. astronomer, J. C. Adams. The theory ascribing the formation of halos to the refraction of light by floating ice crystals was completely demonstrated by G. (and A. Bravais). The third ring round the planet Saturn, commonly known as the 'Crape' ring, was first recorded by G. at Berlin in 1838. In 1875 he pub. the results of the observations of the minor planet Flora in connection with the value determined for the solar parallax.

Galls, called also **Point de Galls**, seaport of Ceylon, situated in the SW. of the is. in the S. prov. It has a good harbour, but is not so important now as a port of call for steamers to the E. and Australia,

G., but as a domestic feature the G. only attained importance with the introduction of the Elizabethan long G.; whence the application of the word to a museum of art treasures. For G. in military mining, see MINES, Military.

Galley, low, flat-built sea-going vessel with one deck, propelled by sails and oars, formerly in common use in the Mediterranean, e.g. by Genoans and Venetians. The rowers were usually slaves or condemned criminals. The term is also applied to warships of ant. Greece and Rome, as well as to the Viking ships (see NORSEMEN) and to a large open rowing boat used by press-gangs.

Galley Slaves (Fr. *galériens*; It. *galeotti*), term applied in olden times to convicted criminals who had to work out their hard labour as rowers on board a galley. In later days such convicts were principally employed on the docks and military harbours of France, Spain, and Italy.

Gallia, in ant. geography 'the country of the Gauls' (Galli), in 2 great divs., Cisalpina or Citerior (on 'this,' i.e. the

Rom. or S. side of the Alps) and Transalpinia or Uterior (across the Alps from Rome). G. Cisalpinia extended S. and E. from the Alps, and was bounded in Caesar's time by Liguria, Umbria, and the Rubicon, comprising N. Italy between the Alps and the Apennines. Gallic invaders came here perhaps as early as the 6th cent. BC. A Rom. colony was estab. at Sena Gallica (282), the country was reduced after the second Punic war (203), and its conquest finally completed on the defeat of the Boii (191). G. Transalpinia extended N. and NW. of the Alps, comprising all modern France (often loosely called 'Gallia'), Belgium, and parts of Holland, Germany, and Switzerland. The Rom. prov. of G. Narbonensis, originally called Provincia (later Provence) was formed in the SE. (121 BC). Julius Caesar thoroughly subdued the whole ter. (58-50 BC), then divided into 3 parts, Aquitania (SW., inhabited by Iberians represented by the modern Basques), Celtic Gaul (in the centre, the cradle of the modern F. nation), and Belgic Gaul (NE., inhabited by Belgae, closely allied to the Celts of central Gaul). Augustus made 4 provs. (27 BC), Narbonensis, Aquitania, Lugdunensis, Belgica. In the 2nd cent. AD Christianity was introduced, and in the 4th cent. there were 2 dioceses, Galliarum and Viennensis.

After invasions by Vandals, Goths, and Franks in the 5th cent., a fresh empire rose on the ruins of the old. See E. Desjardins, *Géographie historique et administrative de la Gaule romaine*, 1877; C. Julian, *Histoire de la Gaule* (8 vols.), 1907-28; A. Grenier, *La Gaule celtique*, 1945; and O. Brogan, *Roman Gaul*, 1953.

Galliard (Fr. *galliarde*; It. *gagliarda*), old lively dance in triple time, much in vogue in the 16th and 17th cents. The G. often appeared in music as a kind of afterpiece paired with the pavan (q.v.), sometimes with the same tune transformed into triple time from the dupe rhythm of the pavan.

Gallie Acid ($C_6H_4(OH)_2COOH$), one of the 6 possible trihydroxybenzoic acids, occurs together with tannin (tannic or gallotannic acid) in gall-nuts, divi-divi, sumach, etc. It forms colourless silky crystals, having an astringent and slightly acid taste, readily dissolves in hot water and melts at 220° C., at the same time decomposing into pyrogallol and carbon dioxide. G. A. is a powerful reducing agent, readily absorbing oxygen in alkaline solution. With iron (ferric) salts a blue-black solution is produced, from which a black precipitate is finally deposited; use is made of this in the production of ink.

Gallicanism, word used in theology to describe certain theories which, while recognising the primacy by divine right of the see of Peter, yet limit the power of the pope in temporal matters and in certain eccles. matters. This attitude of resistance to the papal claims was particularly strong in France, and hence the name G. was given to it, while the church in France is known, in this connection, as the

Gallican Church. G. can only be understood in connection with the rival theory, known as Ultramontanism, which now holds almost complete sway in the Rom. Church. The first clear enunciation of Gallican principles was made in the Pragmatic Sanction (1269) in the reign of St Louis, which declared that the gov. of the Church should be carried out in conformity with the common law, the canons of the councils, and the statutes of the anct fathers. It was still further developed by Philippe le Bel in his conflict with Pope Boniface VIII. The most celebrated expression of G. is found, however, in the Four Propositions of 1682, drawn up by Bossuet and signed by 35 bishops and 35 other clergy. The propositions are: (1) that the pope's jurisdiction is in things spiritual and not in things temporal, and therefore that kings are not subject to eccles. authority in such matters; (2) that the authority of a general council is at all times superior to that of a pope; (3) that the authority of the pope is to be limited by the canons of the universal church, and that the rules, customs, and institutions of the Gallican Church and kingdom remain intact; (4) that the judgment of the pope is not infallible unless it be afterwards confirmed by the whole Church. These declarations, especially the last 3, were frequently condemned by the papal authority, and Ultramontanism, if not in its extreme manifestations, is now substantially triumphant. G. throws much stress on the authority of the civil power, and has therefore been generally condemned as Erastian.

Galliéni, Joseph Simon (1849-1916), Fr. soldier and colonial administrator whose fame rests on the great share he had in winning the first battle of the Marne (1914); b. Saint-Béat, Haute-Garonne, and received his military education at St Cyr. He fought bravely in the Franco-Ger. war of 1870, and increased Fr. power in Senegambia, whither he was sent as captain in 1878. He served with distinction in the Sudan and crushed brigandage in Tonking. He was made governor-general of Madagascar in 1896 and general of div. on his return to France in 1899. In 1904 he was military governor of Lyons, and when the First World War broke out he had virtually retired. At that time he was military governor of Paris, and when the Ger. right wing under Gen. von Kluck changed its direction from SW. to S., thereby leaving Paris on its right, G. at once began to organise his command, and the troops sent by Marshal Joffre to augment it, for a blow at the exposed Ger. right wing when the right moment arrived. The threat was noticed by von Kluck, who halted and faced W. to meet it. It was this movement that arrested the victorious Ger. progress towards Paris. G. became war minister in 1915, but resigned in 1916, and d. in May of the same year. He wrote *Trois colonnes au Tonkin*, 1894-5, *La Pacification de Madagascar*, 1900, and *Neuf Ans à Madagascar*, 1908. See P. Ellis, *Le*

Général Gallieni, 1900, and P. Gheusi, *Le Maréchal Gallieni*, 1921.

Gallienne, Richard Le, see **LE GALLIENNE**.

Gallienus, Publius Licinius Egnatius, Rom. emperor (AD 260-8), and co-regent with Valerian, his father, from 253 until the latter's capture by the Persians in 260. G.'s reign is known as 'the period of the Thirty Tyrants,' for usurpers arose throughout the provs. The most prominent, Aureolus, was proclaimed emperor in Illyricum, invaded Italy, and captured Milan. While besieging him in that city, G. was murdered by his own troops. He was succeeded by Claudius II.

Gallifet, Gaston Alexandre Auguste, Marquis de, Prince de Martignes (1830-1909), Fr. gen., b. Paris, who distinguished himself in the Crimea, the It. campaign (1859), Mexico (1863), and at Sedan in 1870. He commanded the 3rd Chasseurs d'Afrique in the Franco-Ger. war (1870-1), winning fame by his heroic cavalry charge at Sedan. He earned a character for severity by his rigorous measures against the Communists. See his *Mes Souvenirs*.

Gallinaceous Birds, or Galliformes (Lat. *gallus*, a cock), constitute an order under which are included such birds as the Phasianidae, or pheasants, the Tetraonidae, or grouse, Perdidae, partridges and quails, the Megapodidae, or mound-makers; the Cracidae, curassows, and guans; and the Ophthocomidae, the curious hoatzins, or 'stinking pheasants' of South America. They are a widespread group, being found in almost every part of the globe, and they include almost every variety of plumage and shape from that of the common domestic fowl to the beautiful silver pheasant of S. China, which was embrodered as an emblem on mandarins' dresses.

Gallio, Junius Annaeus, Rom. consul of Achaia under Claudius, while St Paul was at Corinth, AD 51-2. He was a brother of Seneca and uncle of Lucan. Ill health induced him to resign, and he was either put to death by Nero's order or committed suicide in 65. G. was an easy-going man, known for his amiability, *dulcem Gallionem*.

Gallipoli: 1. It. seaport, in Apulia (q.v.). It is built on a steep rock on the N.E. shore of the gulf of Taranto (q.v.), 22 m. SSW. of Lecce (q.v.), and has a baroque cathedral and a 13th-cent. castle. There are tunny fisheries, and a trade in olive oil, wine, and fruit. Pop. 15,500.

2. (Turkish *Gelibolu*), Turkish seaport on a peninsula at the N.E. extremity of the European side of the Dardanelles. It has been Turkish property since 1357. The Venetians defeated the Turks here in 1416. G. trades in corn, wine, and oil. The magazine and cellars built by Justinian and other ant. remains are in the vicinity. The tn has 2 harbours and is the prin. station for the Turkish Fleet. It was fortified by the Brit. and Fr. in 1864 and these fortifications were renewed and enlarged in 1878. The guns of G. command the Dardanelles just before the

strait joins the sea of Marmora. Pop. 17,000.

Gallipoli, Strait of, see **DARDANELLES**.

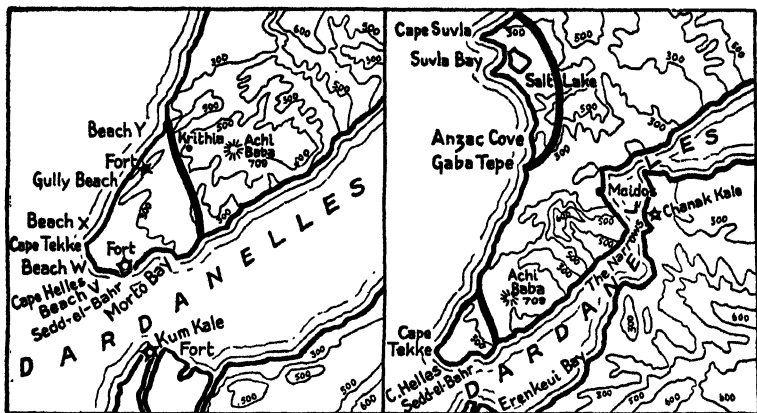
Gallipoli Campaign (1915-16). The naval operations of the early part of 1915-16 in which the allied Anglo-Fr. fleets endeavoured to force the passage of the Dardanelles are described under **DARDANELLES**. This article deals with the military or land operations in the peninsula.

The immediate purpose of the attack on the Dardanelles was to force the straits in order to deal so effective a blow against the Turks that the pressure on Russia might be relieved and Bulgaria deterred from active adherence to the cause of the central powers. It is most likely that had the attack been crowned with success Turkey would have been out of the war, whilst the check to Ger. aspirations in the S.E. (see also **BAGDAD RAILWAY**) would have been so serious that the war might well have been curtailed by as much as 2 years.

Experience having taught the necessity of a combined land and water expedition, the Brit. Cabinet resolved to send out a force to Gallipoli to co-operate with the fleet. It was hoped by effecting a landing of soldiers on the European side of the peninsula to storm Gaba Tepe (q.v.), Achi Baba (q.v.), and other formidable forts and thereby to facilitate the task of the ships in running the 40-m. gauntlet of the straits.

Cape Helles and Anzac Cove Operations—In the last week of April 1915 2 divs. of the Australian Imperial Force and troops of the 29th Div. effected a landing at Helles at the S. tip of the peninsula and also at Anzac Cove (as it was subsequently called), which lies some 15 m. to the N. of Cape Helles. The men scrambled through the water in the face of a murderous hail of bullets, seeking in every conceivable way to shelter themselves on an exposed beach offering nowhere any hope of throwing up defensive works speedily enough to avoid grave casualties. The Australian and New Zealand troops brilliantly scaled a series of steep cliffs and with the most dogged resolution gradually dug themselves in. Of particular interest is the ruse by which the *Clyde*, an old troopship which, like the wooden horse of Troy, concealed numbers of armed men, was brought close up to the shore and the men rapidly disembarked through an improvised gangway.

The Battles for Krithia and Achi Baba.—It was decided, after the landing was effected, to make a combined advance by forces from both the S. and the W. This attack resulted in the sanguinary battle of Cape Helles and the battles for Krithia, the objective being the commanding height of Achi Baba. The attack, however, failed, the enemy being fully prepared, the terrain being ill adapted for offensive operations and the foe being constantly reinforced, as the attack dragged on, by ever more overwhelming numbers. A little ground, however, even against heavy Turkish counter-attacks,



GALLIPOLI AND THE DARDANELLES

The map on the right shows the three main theatres of operations, Suvla Bay, Anzac Cove, and Cape Helles, while on the left is a more detailed map of the Cape Helles area with the well-known names of the places where landings were effected. The black lines show the final positions of the Allies' troops before the evacuation.

was gained during these battles and, in the course of other engagements, during May. In May, June, and July the Turkish armies received a great accession of strength through Russia being forced to abandon her initial plan of co-operating with the Fr. and Brit. from the Black Sea. During these months heavy engagements were fought on 6-8 May (second battle for Krithia) and 4 June (third battle for Krithia). But, in view of the Turkish reinforcements, it was decided to send out, in addition to the 52nd Brit. Div., 3 more regular divs., and 2 territorial divs. of infantry.

The Suvla Bay Plan.—The new plan

was to land troops at Suvla Bay and by a combined advance from there, and from Anzac Cove on the heights of Sari Bair, to cut the Turkish communications on the Gallipoli peninsula. The prin. battles of this ill-starred plan, which began on 6 Aug., were the battles of Sari Bair and Suvla (6-15 Aug.); but, although the allied forces were foiled in their plan, they undoubtedly made such a drain on the Turkish forces that the repercussion was felt both in Syria and in Mesopotamia.

Sari Bair and Suvla.—The operations involved an advance from Anzac on the Sari Bair hills, a landing at Suvla Bay, and an advance thence to join up with



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the colonial troops. The advance on the Sari Bair heights had to be carried out over numerous ravines, and though the heights were reached, the Turkish troops, by heavy counter-attacks, drove the allied forces out again. Added to this check was the failure of the Suvla Bay operations. Troops were landed under cover of night, but grave difficulties of transport and water supply nullified any advantage that might have been gained by this surprise. Far more casualties indeed occurred through dysentery, from lack of water, and general disorganisation of auxiliary services, than through actual fighting, there being in fact but little resistance to the landing parties. The result of these failures was that the attempt to clear the European side of the straits was abandoned; but it was made clear to the world through official pronouncements that the Allies would certainly remain on the peninsula. This they did until the end of the year, the troops digging themselves in and carrying on months of trying trench warfare which at least had the effect of greatly impairing the Turkish forces. The endurance of the allied troops during this terrible campaign is a veritable epic in Brit. military hist.

Results of the Campaign.—The prin. object of the Gallipoli operations was not effected and the evacuation, brilliantly carried out in Dec. 1915 and Jan. 1916, brought the operations to a close. The conception was sound, but the means at the disposal of the Allies, and the inevitable disorganisation resulting from local circumstances, rendered its execution all but impossible. Indirectly, however, the campaign achieved limited results in the wastage of the Turkish armies, which, apart from the victory over Gen. Townshend's small force at Kut, never seriously hampered the steady pressure of the Brit. and Fr. in Palestine and the Brit. in Mesopotamia and the Russians in Armenia.

Casualties (approx.): 30,000 killed and d. of wounds; 8000 missing and prisoners; 74,000 wounded. See Sir Ian Hamilton, *Gallipoli Diary*, 1920; C. F. Aspinall-Oglander, *Gallipoli*, 1923-31; Sir W. S. Churchill, *The World Crisis*, 1923-9; Alan Moorehead, *Gallipoli*, 1956.

Gallium, metallic element first discovered by Lecoq de Boisbaudran in 1875 by spectroscopic analysis of a zinc blende from Pierrefitte in the Pyrenees.

It occurs in blendes from different localities and also, but in minute amounts, in other minerals. G. is obtained by dissolving the ore in acids, treating with zinc to precipitate the foreign metals, redissolving the precipitate in hydrochloric acid, and throwing out the G. in the cold with zinc. Subsequent fractionation yields G. in the pure state. In properties G. is allied to aluminium. It has a characteristic spectrum—2 lines in the blue and violet. Atomic weight, 70; atomic number, 31; symbol, Ga; melting-point, 30.1°. It is identical with Mendeleev's hypothetical eka-aluminium. G. is very widely distributed, but usually in

very minute quantities. It seems likely to find industrial application in electric lamps and in optical apparatus.

Gallivara, or **Gellivara**, tn. of Sweden, situated about 130 m. NW. of Lulea, with which port it is connected by rail. There is also a railway line connecting G. with the Ofoten Fjord, Norway. The iron-mines near this tn. are exceedingly productive, the output being considerably over 1,000,000 tons per year. Pop. 12,500.

Gallon, and **Ale Gallon**, **Wine Gallon**, see METROLOGY.

Galloway, **Joseph** (c. 1731-1803), Amer. lawyer and anti-nationalist, b. in Kent co., Maryland; early removed to Philadelphia. Member of the Pennsylvania Assembly during most of the period 1757-1774. He was against proprietary gov. and advocated the erection of Pennsylvania into a royal prov. He married a daughter of Lawrence Growden, Speaker of the Assembly, and was himself Speaker, 1766-74. Opposing the ideas of the revolution, he proposed, as a member of the Congress of 1774, a scheme of gov. consisting of a president-general, appointed by the king, and a grand council elected for 3 years by the various assemblies of the colonies. This was rejected by a narrow majority. In Dec. 1776 G. joined the Brit. Army under Sir Wm Howe, and he became civil administrator of Philadelphia on its capture. He accompanied the army to New York. In 1778 he went to England, and his estate of £40,000 was confiscated by Congress. He wrote many pamphlets on Amer. and biblical subjects.

Galloway, fertile and extensive dist. in the SW. of Scotland, comprising Wigtonshire and the Stewartry of Kirkcudbright. It is bounded by Ayrshire, the sea, the Solway Firth, and the R. Nith, and is divided into Upper and Lower G. Famed for its breed of hornless black cattle, with dairy-farming as its prin. industry. The climate is mild, and there is much diversity of scenery. G. is associated with the story of the Covenanters (q.v.). G. contains a predominantly Celtic element and, indeed, it is not very long ago that the Gaelic of G. d. out. The first waves of the Celts who arrived in Britain are traced to G. and the region between the Solway and the Clyde, and they retained their identity and language longer than was the case anywhere else in the S. of Scotland where they settled.

Galloway, Mull of, rugged and mountainous promontory, situated at the SW. extremity of the G. peninsula, Wigtonshire, and the most S. point of Scotland. On its E. side it rises to a height of 210 ft, crowned by a lighthouse 60 ft high.

Galloway Breed, see CATTLE.

Gallowgane, see ELLAGIC ACID.

Gallowglass (Irish *gíolla*, a manservant), heavy-armed foot soldier or chieftain's retainer who fought in the old Irish wars. Armour-bearers in the Scottish Highlands were once so called and are mentioned in Shakespeare's *Macbeth* as coming, with Kernes, from the W. isles of Scotland.

Gallus, Cornelius (c. 70–26 BC), Rom. poet, b. Forum Julii (Fréjus) in Gaul, and the friend of Virgil and Ovid. None of his works survive, but some believe him to have been the author of the *Ciris* attributed by Suetonius to Virgil.

Gallus, Gaius Aquilius, Rom. equestrian, praetor in 66 BC. He was a pupil of Q. Mucius Scaevola the pontifex, and became celebrated as a jurist. G.'s writings were ed. by his pupil Servius Sulpicius, himself a famous jurist. Cicero eulogised G. for having promulgated an edictal rule on fraud in matters of buying and selling.

Gallus, Gaius Vibius Trebonianus, Rom. emperor (AD 251–4), is said (though no upon cogent evidence) to have been treacherously concerned in the defeat and death of Decius, whom he succeeded. After his accession G. concluded a dishonourable peace with the Goths, conceding them a fixed ann. tribute and allowing them to retain their captives and plunder. He was killed by his own soldiers when on the march to suppress another Gothic invasion.

Galluzzo, It. vil., in Tuscany (q.v.), 2 m. SW. of Florence (q.v.). On a hill near the vil. is a famous fortress-like Carthusian monastery, the *Certosa di Montecassino*, which dates back to 1342 and contains numerous art treasures. It has been restored after damage during the Second World War.

Gally, Merritt (1838–1904), Amer. inventor, b. near Rochester, New York. He was ordained Presbyterian minister in 1866, but resigned owing to voice trouble, and interested himself thenceforward in mechanics. He took out more than 400 patents, many connected with printing machinery. His inventions included the Univ. printing press, a machine for the manuf. of printers' types from cold metal by swaging, and the composite swage-locked type-bar or linotype. He was also the inventor of the 'orchestrone,' and made many productive experiments with automatic musical instruments.

Galston, burgh of Ayrshire, Scotland, on the Irvine, E. of Kilmarnock, and is engaged in the manuf. of lace and hosiery goods. Pop. 4560.

Galsworthy, John (1867–1933), novelist and dramatist, b. Kingston Hill, Surrey. He was educ. at Harrow and New College, Oxford, where in 1889 he took an honours degree in law. He was called to the Bar by Lincoln's Inn, but instead of practising he went on a trip to the Far East, making the voyage in merchant ships, and on the sailing ship *Torrens* met Joseph Conrad. In 1897 he pub. a book of stories, *From the Four Winds*, under the name John Sinjohn; in 1898 the novel *Jocelyn*, in 1900 another novel, *Villa Rubicun*, and in 1901 *A Man of Devon* and other tales. *The Island Pharisees*, a novel pub. in 1904, was the first book to appear under his own name. In 1906 *The Man of Property* was pub. This, the first of that great series of novels 'The Forsyte Saga' and 'The Modern Comedy,' is the most dramatic of his novels, and the

complete saga probably his greatest work. He himself says of the Saga that it 'cannot be absolved from the charge of embalming the upper middle-class life,' and in the complete success of this undertaking consists its greatness.

In 1906 G. first became known as a dramatist with the play *The Silver Box*. In 1907 came the comedy *Joy* and the novel *The Country House*. A vol. of sketches, *A Commentary*, was pub. in 1908, and in 1909 the important novel *Fraternity*; also during that year the play *Strife* was first performed, to be followed in



E.N.A.

JOHN GALSWORTHY

1910 by *Justice*, and another vol. of sketches, *Motley*, and in 1911 by the novel *The Patrician*, *The Inn of Tranquillity* (further sketches), and the play *The Little Dream*. In 1912 he pub. a book of verse, *Moods, Songs and Doggerels*, and in the same year the original tragi-comedy *The Pigeon* and the play *The Eldest Son* were first performed. The novel *The Dark Flower* and *The Fugitive*, a drama, came in 1913; the novel *The Freelanders* and the play *A Bit of Love* in 1915; in 1917 *Beyond*, a novel, and the play *The Foundations*, in 1918 *Indian Summer of a Forsyte*, a delicate short story, later included in 'The Forsyte Saga'; *The Five Tales*, *Another Sheaf*, *The Burning Spear*, and *The Saint's Progress* in 1919. In 1920, *In Chancery*, the second vol. of 'The Forsyte Saga,' was pub., and in 1921 the last vol. of the trilogy, *To Let*. *The Skin Game* was first

performed in 1920, and in that year *Tatterdemalion*, a collection of war stories, was pub.; the comedy *A Family Man* was produced in 1921, and in 1922 *Loyalties* and *Windows*. More tales, *Captures*, appeared in 1923, and in 1924 *Old English*, an earlier story dramatised, was first performed, and later in that year the play *The Forest*. At this time also *The White Monkey*, the first book of the second trilogy, 'The Modern Comedy,' was pub., to be followed by the second book, *The Silver Spoon* in 1926, in 1927 by 2 interludes, later to be included in the second trilogy, and in 1928 by the last book of the cycle, *Swan Song*. Another play, *The Show*, was produced in 1925, and in 1926 the drama *Escape*. A selection of earlier and unpublished poems, *Verees New and Old*, was pub. in 1921, in 1927 a book of essays, *Castles in Spain and other Screeds*, and *The Way to Prepare Peace*; *The Roof*, a play, in 1929, and in 1930 a book of short stories, *On Forsythe 'Change*. In 1929 G. was awarded the Order of Merit and, in 1932, the Nobel prize for literature. His last novel, *Flowering Wilderness*, appeared in 1932. *Over the River* was pub. posthumously in 1933.

G. is sometimes considered to use too much propaganda in his works, particularly in his plays, but he uses it rather as a framework than as the purpose of his plays. He is ironical but humanitarian, reserved—and this reveals itself in reticence and sparseness of words in dialogue—and although seemingly oppressed by the sadness of life, he has a sense of humour and a great appreciation of beauty. His work was influenced by Turgenyev and Maupassant, whom he read a great deal in his youth, but it is essentially Eng. *The Silver Box* is a play typical of his dramatic methods, and *The Man of Property* contains the essence of his greatness as a novelist. It has been well said that if no biographical facts were available about G. it would be possible to deduce from his works and from their style that he was an aristocrat and that he had had a legal training. His books are not especially rich in incident, but they convey an almost unique effect of abstract beauty suspended in an ethereal atmosphere. His purpose as a novelist, which will be found stated allegorically in his *Inn of Tranquillity*, is that of a light-bearer in dark places—to show in a detached manner what is there, whether good or bad; but readers are very divided on the question of his reputed impartiality. The conviction is irresistible, however, that the dominant motif of his work is the cult of the underdog. Like a judge he weighs the evidence, but his emotions are apt to colour the impartiality of his presentation. His plays show a remarkable economy of construction, and in the later work the economy of style and characterisation is so extreme as to produce the effect of meagreness and a want of human warmth. See lives by Sheila Kaye-Smith, 1916; L. Schallit, 1928; and H. Ould, 1934; H. V.

Marriot, *The Life and Letters of John Galsworthy*, 1935; and R. H. Mottram, *For Some We Loved*, 1956.

Galt, Sir Alexander Tilloch (1817-93), Canadian politician, b. Chelsea. In 1835 he went to Canada, and 14 years later sat in the Canadian Parliament. In 1858 he drew up his memorandum on Confederation; and in 1859, as minister of finance, introduced Canada's first protective tariff. He was closely connected with the Grand Trunk Railroad. G. became first minister of finance of the Dominion of Canada, 1867. In England in 1880-3 he adopted the title of Canadian 'High Commissioner.' He wrote *Civil Liberty in Lower Canada*, 1876, and *The Future of the Dominion of Canada*, 1881.

Galt, John (1779-1839), novelist and dramatist, b. Irvine, Ayrshire, son of a sea captain. He first worked unsuccessfully in London, then travelled extensively on the Continent, where he made friends with Byron (of whom he wrote a life). Returning to England, he pub. 'Letters from the Levant' in *Blackwood's Magazine*; *The Ayrshire Legatees*, 1820, and his masterpiece, *Annals of the Parish*, in the following year. In 1826 he went to Canada as secretary of a land company, and founded the tn of Guelph, but the venture was unsuccessful and he returned to Scotland broken in health and fortune. His works include an *Autobiography*, 1833, *Literary Life and Miscellanies*, 1834, and a number of novels, including *The Provost*, 1822, *Sir Andrew Wyllie*, 1822, and *Laurie Todd*, 1830. He married the daughter of Dr Tilloch, the proprietor of the *Star* newspaper, for which he worked. G. was a prolific but unequal writer, unrivalled in his delineation of life in small Scottish tns. An ed. of his works, with introduction by S. R. Crockett, was pub. in 1896. See lives by W. Maginn, 1830; Sir G. Douglas, 1897; and J. W. Aberdein, 1936.

Galt, city of Ontario, Canada, 54 m. W. of Toronto and 24 m. NW. of Hamilton. On main line of Canadian Pacific railway, and branch lines of Canadian National railways, with electric railways to Kitchener and Brantford. Market centre for tns of Preston and Hespeler and vils. of Ayr, Blair, Dumfries, etc. It lies in a rich agric. dist., and has 13 churches, 3 parks, 2 hospitals, a co-educational school, and a fine public library. Industries include boilers, boots, brass goods, edge tools, engines, farm implements, leather, belts, lime, lumber, safes, soap and oils, nails, etc. The neighbourhood supplies limestone, sand, lime, and natural gas. It is named after John G. (q.v.). Pop. 22,185.

Galtze Mountains, Ireland's finest inland range, in the SW. of co. Tipperary. The highest summit is Galtymore (3013 ft), on the S. of which are the huge Mitchelstown caves. N. of the mts is the Glen of Aherlow with an extensive State forest. The R. Aherlow abounds in fish.

Galton, Sir Francis (1822-1911), anthropologist, cousin of Charles Darwin, was b. Duddleston, Warwickshire. Educ. at

King Edward VI Grammar School, Birmingham, he became medical student at Birmingham Hospital and King's College, London, and took his degree at Trinity College, Cambridge, 1844. He devoted himself to the study of heredity, and endowed a research fellowship for the study of eugenics in the univ. of London, 1904. He systematised finger-print methods of crime detection. G. received a knighthood in 1909. His prin. works are *Meteorographica*, 1863, *Hereditary Genius*, 1869, *English Men of Science, their Nature and Nurture*, 1874, *Human Faculty and its Development*, 1883, *Natural Inheritance*, 1889, and *Memories of My Life*, 1908. See life by K. Pearson, 1914-24.

Galuppi, Baldassare (1706-85), It. composer, particularly noted for his comic operas, b. Burano, near Venice. He also wrote sacred music and sonatas for the harpsichord. He often set librettos written for him by Goldoni (q.v.). See A. Della Corte, *Baldassare Galuppi: profilo critico*, 1948.

Galvani, Luigi (1737-98), It. physiologist, b. Bologna, and in spite of his wish to enter the Church was educ. for the medical profession. He graduated at Bologna in 1759, and became professor of anatomy there in 1766. His greatest discovery was pub. in the treatise called *De Viribus Electricitatis in motu Musculari Commentarius*, 1791. The word galvanism is derived from his name, as also galvanometer. His whole research was directed towards ascertaining the relation of animal muscle to electricity, and he initiated the study of electrophysiology. He refused in 1797 to take the oaths of the gov. of the new Cisalpine rep., and was deprived of his chair at the univ. Before he could be reinstated he d.

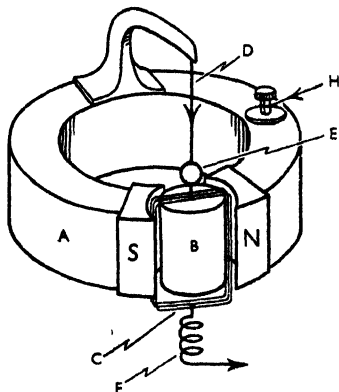
Galvanising, name applied to the process of coating iron or steel with zinc to preserve it from rusting. The iron, thoroughly cleaned by scouring with dilute sulphuric or hydrochloric acid and sand, is dipped into a bath of molten zinc covered with ammonium chloride to act as a flux, whereby a protecting layer of zinc-iron alloy is formed on the outside. The temp. of the bath varies from 450° to 480° C. G. was first practised about 1837; iron so treated withstands the action of air and moisture better than tinplate (q.v.), hence it is extensively used for single wire, wire-netting, corrugated roofing, cooking vessels, chains, water tanks, etc. *Galvannealing* is employed to improve the adhesion of the galvanised coating, and is usually applied to give flexibility to galvanised wire. The wire is passed, immediately after G., through a furnace maintained at 650-700° C. for about 15 min.

Galvanism, term applied to the method of alleviation of pain and cure of disease by means of current of electricity. The current may be obtained from a battery of cells, or by means of a switchboard where electrical power is available. An alternating current may be used instead of a direct current, and is often of much

value for therapeutic purposes. The terminals of the source of the current are connected to metallic electrodes which are covered with some absorbent material. To make the resistance of the skin of the patient as low as possible the electrodes and the skin are well wetted with a solution of sodium bicarbonate. The electrodes are applied to the body and the current passes from the one to the other through the body. Great care must be taken to prevent the metal touching the skin, and to avoid too strong a current.

Galvanometer, instrument for detection and measurement of small electric currents.

Moving-magnet Galvanometers.—A small bar magnet is suspended by a fine quartz



MOVING-COIL GALVANOMETER

wire at the centre of a flat vertical coil of many turns of fine wire. If the plane of the coil is placed in the magnetic meridian and a current flows in the coil, the magnet is deflected by an angle whose *tangent* is the ratio of the magnetising force of the current, proportional to the ampere turns, and the intensity of the earth's magnetic field. A small mirror is fixed on the magnet, a beam of light is focussed on the mirror by a lamp and lens with a vertical wire next to the lens, and the reflected image is viewed on a translucent scale fixed above the lamp. When the magnet is deflected through an angle α , the reflected beam is deflected through 2α . The instrument is screened against outside magnetic effects by enclosure in a Mumetal case. An astatic needle practically eliminates the effect of terrestrial magnetism. It consists of 2 equal magnets rigidly connected one above the other, parallel but in opposite N.-S. sense. The coil is wound in figure-8 round the 2 magnets, so that the current deflects them both in the same direction. The swinging of the needle may be damped by mica vanes fixed on the magnet system.

Moving-coil Galvanometers.—A coil of fine wire is suspended by a phosphor-bronze strip in the gap between the poles of a magnet and a soft-iron cylinder (see figure). The current passes from the terminal H to the suspension D, thence to the coil and out at F. When a current passes through the coil, this is deflected until the magnetic force balances the restoring couple due to the torsion of the suspension. The reading of the deflection by the light-beam reflected from the mirror is as for the moving-magnet G. The swinging of the coil may be damped by winding it on a metal frame.

String Galvanometers.—A fine silvered quartz fibre is stretched taut in a strong magnetic field and at right angles to its lines of force. The current passes along the fibre by way of its metallic coating, and the deflection is viewed in microscope.

Ballistic Galvanometers are used for measuring current-impulses. The motion of the swinging system is not damped, but the time of swing should be so long that the impulse to be measured has passed before the first deflection is completed. The ballistic G. is used for measuring the discharge of a capacitor, and for magnetic testing. The magnetising-current circuit is connected through a reversing switch and a few turns of fine wire (search coil) are wound round the magnet and connected to the ballistic G. On reversing the current, the change in the magnetic field induces a momentary e.m.f. in the 'search coil,' and the ballistic G. deflection is a measure of the e.m.f.

Alternating-current Galvanometers.—The moving system in the vibration G. is so adjusted that the frequency of vibration equals the frequency of the a.c. to be tested. A small current passed through the G. sets the system vibrating by resonance and a mirror fixed on the vibrator shows a wide luminous band.

See A. Gray, *Absolute Measurements in Electricity and Magnetism*, 1921; D. J. Bolton, *Electrical Measuring Instruments and Supply Meters*, 1923; and E. W. Golding, *Electrical Measurements and Measuring Instruments*, 1940.

Galveston, port of entry and cap. of G. co., Texas, U.S.A., on G. Is. (N.E.), at the mouth of G. Bay. Next to New Orleans it is the most important port on the Gulf of Mexico, and trades with Great Britain, France, Cuba, Mexico, and Brazil. Its harbour, which is the best in the state, has over 12 ft. of water on the bar at low tide. The chief export is cotton; others are grain, timber, cattle, hides, oil-cake, and petroleum. There are iron foundries, machine-shops, cigar factories, grain elevators, and manufs. of flour, ice, rope, bagging, cotton-seed oil, cotton-cake, etc. There are regular steamship sailings to all parts of the globe. It is a Catholic bishop's see, and has sev. academies. Settled in 1837, it was captured by the Federals (1862) and retaken by the Confederates (1863). A fire in 1885 caused much destruction, and worse havoc was wrought by a storm and influx

of the sea (1900). Precautions against a similar disaster include a 4½ m. sea-wall and raising of the city's level. Pop. 66,600.

Galvin, George, see LENO, DAN.

Galway: 1. Maritime co. of Connaught, Rep. of Ireland, bounded W. by the Atlantic (coast much indented); S. by Clare co.; SE. by Tipperary, Lough Derg, and the Shannon; E. by Offaly and Roscommon; N. by Roscommon and Mayo. Among the is. off the coast are Inishboffin, Inishark, Gorumna (N.W.), and the Aran Is., which form a natural breakwater at the entrance to G. Bay (about 20 m. broad) between G. and Clare coos. (SW.). The surface is mountainous in the W., with the Twelve Pins group and the Mamturk Mts (over 2300 ft). The Slieve Baughta (Aughty) Mts come further S. G. contains Lough Corrib and part of Lough Mask. The chief rivs. are the Shannon and its tribs. the Suck, the Black, and the Clare. There are wild moorland tracts in the W., such as Joyce's Country, Connemara (noted for marble), and Iar-Connaught. A branch of the Grand Canal connects the Shannon harbour with Ballinasloe. Agric. produce, wool, and marble are the chief exports. Limestone is plentiful, and copper ore is found at Roundstone (SW.). Area 2293 sq. m.; pop. 160,124.

2. Cap. of above, parl. bor. and seaport on G. Bay, 115 m. W. of Dublin, at the mouth of the Corrib. Claddagh vil., formerly the fishermen's quarter, is close by. Salthill, a leading tourist resort, is a suburb of G. city. Hats, woollen goods, chemicals, artificial manures, and ammunition are the chief manufs., and kelp on the coast. G. is the seat of a Rom. Catholic bishop. Queen's College (founded about 1845) was renamed Univ. College (1908). Pop. 21,271. See J. Hardiman, *History of the Town and County of Galway*, 1820.

Gama, Vasco da (1469-1524), Portuguese navigator, b. Sines, in the prov. of Alentejo. He early estab. a reputation as a fearless sailor, and followed closely in the footsteps of Prince Henry of Portugal. In 1497 he was dispatched with 3 vessels to attempt to round the Cape. With incredible difficulties to face he at last succeeded in doing so, and continued his journey across the Indian Ocean to Calicut. Here he estab. a settlement, but owing to the hostility of the natives had great difficulty in forcing his way out of the harbour. He returned to Portugal in 1499, and was raised to the nobility. At the same time an expedition was dispatched to plant a Portuguese colony at Calicut, but the atrocities of the natives caused G. to be sent out there again. He estab. a number of stations on his way there, and finally returned with rich booty to Portugal in 1503. It was not until 1524 that his services were next required. The atrocities at Calicut had again become excessive, and G. was again dispatched. He succeeded in restoring Portuguese prestige, but on the way back he d. at Cochín. See G. Correa, *The Three*

Voyages of Vasco da Gama and his Vice-royalty (Hakluyt Society), 1869; R. W. Major, *Discoveries of Prince Henry of Portugal, 1482-77*; *The Lusitana of Camoens*; and Castan Leda, *Historia do Descobrimento da India, 1551*, largely based on MSS. of Alvaro Vilho, a trans. of which MSS. by Ferdinand Denis is to be found in E. Charton's *Voyageurs Anciens et Modernes* (vol. iii), 1855. See also E. G. Ravenstein (trans. and ed.), *Journal of the First Voyage of Vasco da Gama, 1482*; K. G. Jayne, *Vasco da Gama and his Successors, 1910*; and J. P. Alaux, *Vasco da Gama, ou l'épopée des portugais aux Indes, 1931*.

Gamaliel (d. AD 52), famous Pharisee and Rabbi, and a well-known and influential member of the Sanhedrin. He was the grandson of Hillel. As a doctor of the law he was more tolerant, peaceful, and broad-minded than others. He had a great liking for Greek, and studied that language and the manners and customs of the people. G. does not seem, on any reliable authority, ever to have been inclined towards Christianity, in spite of his defence of Sts Peter and John (Acts v. 34). Recent studies suggest that he belonged to a generation earlier than that of G. the Elder, who is often referred to in the Mishna.

Gamba, Viola da, see VIOL.

Gambeson, see ARMOUR.

Gambetta, Léon Michel (1838-82), Fr. statesman, b. Cahors, of Jewish-It. extraction. He became a member of the Paris Bar and soon became well known for his radical republican views. He became a deputy in 1869 and was primarily responsible for the proclamation of the 3rd rep. after the disaster of Sedan. The provisional gov. which was formed to conduct affairs after this defeat was largely under his influence, and he held the portfolio of the Ministry of the Interior. He conducted the defence of Paris, but after the beginning of the siege he escaped from Paris by means of a balloon, and conducted the war from outside. He struggled on bravely to the end, and was bitterly opposed to any surrender, and he was finally repudiated by the Fr. provisional gov. and fled to Spain. He was soon, however, re-elected as a deputy, and from 1872 onwards he took his place as the leader of the Republican party, putting forward an advanced radical programme. He was instrumental in preventing the attempted royalist restoration under the duc de Broglie in 1877, and quarrelled violently with MacMahon. For making statements about MacMahon which were held to be libellous he was arrested and imprisoned, but his popularity was so great that he gained a virtual victory over the president, who subsequently resigned. In 1879 he became president of the Chamber of Deputies, and 2 years later premier. His revision of the constitution was, however, rejected, and he retired. He d. 2 years later as the result of a pistol accident. His *Discours et plaidoyers* were pub. 1881-5, and *Dépêches, décrets, 1886-91*. See J.

Reinach, *Histoire du ministre Gambetta, 1884*; and H. Stannard, *Gambetta and the Foundations of the Third Republic, 1921*; and lives by P. Deschanel, 1919, P. Matter, 1923, and J. P. T. Bury, 1936.

Gambia: 1. Riv. of West Africa, flowing for about 700 m. through Fr. Guinea, Senegal, and G. It discharges into the Atlantic at Bathurst through a deep estuary. Light craft can ascend as far as the Barraconda Rapida, 350 m. from the estuary, and about 150 m. further when the riv. is in flood.

2. Brit. crown colony and protectorate on W. coast of Africa. It extends for about 250 m. along each bank of the R. G., and its area, including that of the parts of the colony administered as a protectorate, is 4003 sq. m. The Fr. have been given access to the navigable parts of the riv. The chief tn is Bathurst, on the is. of St Mary. The tn is built on piles, and considerable improvements have been effected in recent years. Together with Georgetown and some adjoining land and is. it forms the colony proper, which has an area of 89 sq. m.

The remainder of the ter. constitutes the protectorate. The country consists largely of creeks and swamps. The protectorate contains 4 provs., each under a commissioner who is responsible to a senior commissioner for the protectorate, who is, in turn, responsible to the governor. By an ordinance of 1946 the Kombo St Mary Div. was subtracted from South Bank Prov. and added to the colony.

There are sev. elementary and secondary schools run by the gov. and the Church. School-children enrolled (1956) totalled 2813. Internal communication is maintained by steamers or launches; there are no local railways. Bathurst is connected with St Vincent and Sierra Leone by cable and with tns in the protectorate by wireless. The prin. exports are groundnuts, hides and skins, palm kernels, and beeswax. The prin. imports are cement, edible oils, tobacco, cotton yarn and piece goods, wheat flour, rice, motor vehicles, sugar, wearing apparel, petroleum, and kola-nuts.

G. was discovered by the early Portuguese navigators, but no settlement was made. The Brit. colony was founded purely for trading purposes, the original patent being granted in 1588 by Queen Elizabeth. Later various merchant companies obtained charters and settled along the riv. banks. From 1807 G. was controlled from Sierra Leone, but in 1843 it was made an independent crown colony. It was recognised as Brit. by the treaty of Paris, 1814. In 1866 it was included in the West African Settlements, but was again a separate crown colony in 1888. In 1953, following recommendations, the secretary of state approved a new constitution. It was introduced in 1954, and its provisions apply both to the colony and to the protectorate. The Executive Council consists of 4 *ex officio* members and 1 official member, and not less than 6 appointed members. Thus for the first time there is an unofficial majority in the

Executive Council. The Legislative Council, which met for the first time in Dec. 1854, consists of a speaker, 4 *ex officio* members, 1 nominated official member, 2 nominated unofficial members, and 14 elected members. Meetings of the Council are usually presided over by the speaker, but the governor has the right to attend any meeting and to preside. The governor attends and presides at meetings of the Executive Council, and he has reserve powers to legislate by declaration if he considers it expedient. Pop. (colony) 27,297; (protectorate) 260,929.

Gambier, James, Baron (1756-1833), adm., b. in the Bahamas. He entered the navy and rose rapidly in its service. He served under Lord Howe in 1794, and commanded the fleet which bombarded Copenhagen in 1807. He was present with Cochrane at the battle in Aix Roads in 1809, but refusing to act on that sailor's advice was tried by court-martial and honourably acquitted. He was made an adm. of the fleet in 1830, and d. 3 years later. His memoirs were pub. in 1861 by Lady Chatterton.

Gambit, see CHESS.

Gambling may be broadly defined as the playing at games of chance or wagering on some fortuitous event for money or money's worth. At the common law all games were allowed provided they were played fairly. When the legislature first intervened is not quite certain, but once having done so it classed together as illegal all sorts of games and pastimes such as cards, dice, cock-fighting, and races, without regard to the absence of any inherent common element. Perhaps the earliest instance of state interference was the proclamation issued by Edward III, who is recorded to have looked with disfavour on games of stones, bars, hand-ball, football, cock-fighting *et alios vanos ludos*, not because of anything vicious in the games *per se*, but apparently because he found that his subjects preferred such peaceful games to the 'noble sports of war.' The proclamation was therefore made, according to some historians, not out of regard for the moral welfare of the people, but in the interests of recruiting for the army. Statutory restrictions on games and gaming are to be found as early as the reign of Richard II. The object of these and subsequent statutes has generally been to punish as public nuisances all manner of games of chance by referring the persons who play at them to the category of rogues and vagabonds. Old writers assign the quaintest reasons for this legislative interference. In regard to the later statutes against gaming and wagering, including the prohibition of lotteries, it is to be noted that the principle varies according as the statute is creating a criminal offence or merely declaring that certain contracts shall not be civilly enforceable. (As to this see also GAMING.) G. or wagering contracts are unenforceable simply because there is no legal consideration (see CONSIDERATION; CONTRACT). The principle underlying the Acts which punish certain

forms of G. as indictable offences is by no means clear. As the criminal law now stands a number of games are expressly forbidden, avowedly on the principle that they are games of chance. The Gaming Act, 1845, the Betting Act, 1853, the Gaming House Act, 1854, the Vagrancy Act, 1873, and the Street Betting Act, 1906, without expressly defining gaming, strengthen the common law against the keeping of common gaming houses or betting in the streets or other public places, presumably on the common law principle that such practices are public nuisances in that they promote cheating and other corrupt practices. But the element of chance as the deciding factor is apparent in most of them. Members of a bona fide club may bet with each other at their club, and apparently betting in the streets could only be punished if any person were found frequenting or loitering in the streets or other public places for an appreciable time for that purpose (see BETTING).

Certain games are expressly made unlawful by a series of statutes: they are ace of hearts, pharaoh (faro), basset, hazard, roulette, passage, and every other game played with dice or any instrument, engine, or device in the nature of dice, having figures or numbers on it, but not backgammon or games played on backgammon tables. The prohibition is wide enough to include any card game of mere chance, and that form of *baccarat* called *chemin de fer* (q.v.) has been vetoed since 1895. In the celebrated case of *Jenks v. Turpin* (1884), where a divisional court upheld a magisterial decision which punished the playing of *baccarat banque* in a gaming-house, the only substantial argument urged against the inclusion of this game was that the element of skill consisted in the player determining whether he would stand on the card dealt to him or take another. Considerable public comment was evoked by a later decision of the courts against progressive wheel drives. The principle of the decision was that the element of chance altogether predominated over that of skill, especially as after the first hands were played no player knew who his partners were going to be for the rest of the drive, and further that weak or unskilful players might be indiscriminately pitted against strong players. The craze for limericks in certain pubs, was also suppressed by decisions which declared that such competitions were mere lotteries. The Lotteries Act, 1823, punishes as rogues and vagabonds persons who sell tickets or chances in lotteries authorised by foreign potentates or states, and an Act of 1836 provides penalties for advertising lotteries. The Small Lotteries and Gaming Act, 1954, permits the holding of small private gaming parties not promoted for private profit provided that the prize money does not exceed £20 and the stake of each participant is only 5s. See also LOTTERY.

There can be no doubt about the popular love of G. at all times and in

all countries. The periodical raiding of West End clubs and the organisation, especially since the First World War, of sweepstakes offering immense prizes are evidence of this fact (see CALCUTTA SWEEPSTAKE). It was by analogy with the principle of betting in a club that the football pools continued to function after it was decided by the courts that the publication of forms in the press was illegal. It seems evident that pools partake of the nature of both lotteries and sweepstakes; but the position regarding both is as obscure as it is on the licensing of bookmakers and the estab. of totalisators on race-courses, and it may be said that the law on G. is publicly flouted every day. The G. instinct is more prevalent among the hot-blooded and oriental races. If that were not so it would be difficult to explain the absence of restrictions on such games as roulette and *trente-et-quarante* in France, Monaco, and, formerly, in Portuguese colonies, and other countries inhabited mostly by Lat. races, and in China. For a time, it is true, Ostend was a serious rival to Monte Carlo; but in 1902 the Belgian Parliament suppressed public gaming, and awarded compensation to the gaming-house proprietors of Ostend. Baccarat is still prevalent in France, although strictly regulated by the clubs who play the game. The Chinese are a race of notorious gamblers, and there is curiously intermingled a strong vein of superstition.

At the present day, however, it must be conceded that even among Lat. races G. is less and less favoured by the various states, and that this disfavour has resulted in the isolation of Monaco as the one spot in Europe where the roulette whirls, not only by the sanction of the state, but for the express purpose of providing the revenue to support it, and such epithets as 'a hot-bed of vice,' 'the plague spot of Europe,' 'the pickpockets' paradise,' 'the wastrels' Eldorado,' and so forth have been showered on this place. See MONTE CARLO; ROULETTE. See also GAMING and under the various games, CHEMIN DE FER; TRENTE-ET-QUARANTE, etc.

Gamboge, resinous gum which is procured from certain trees in Siam, Ceylon, and other tropical places. It may be used medicinally as a purgative, but cannot be used alone. It is also used as a source of a yellow pigment.

Gambrel Roof, in architecture, an Amer. term for a roof of double slope (see also MANSARD ROOF), a type introduced into New England during the 17th cent.

Gambrinus, mythical Flem. king who is supposed to have commenced the brewing of beer. His name may be derived from Gan Primus, who was the president of the Guild of Brewers.

Game Laws. Laws relating to the preservation of game and the punishment of persons unlawfully killing game have sunk to a position of insignificance as compared with a century ago. Blackstone in his time could truly write of the offence of destroying game, that the sportsmen of England seemed to think it

of the highest importance, and the only one of general and national concern. The statutes anent the subject were many and various, and, as the classical commentator said, not even grammatical. Moreover, they exhibited the worst features of class legislation, for they drew broad distinctions between offenders of such rank as was called a 'qualification' (i.e. being the son and heir apparent of an esquire) and indigent offenders. Traditions, however, die hard, and the G. L. were a legacy of the repressive forest laws of the Conqueror. For centuries the one passion of the Eng. landed gentry seems to have been the pursuit of game, and no punishment was too terrible for the poverty-stricken wretch who poached to supply his needs. Even as late as 1827 an Act was passed punishing the felony of killing or wounding deer in any enclosed land with transportation for 7 years. But the protecting of game by oppressive laws was probably more injurious to the morals of the rural pop. than any other single cause. The game swarmed before the labourer returning home from a day of unremunerative toil. Repression only led to night poaching with violent resistance to escape detection. The jails were not large enough to contain the hundreds of prisoners annually convicted. The total public expenditure which the preservation of game occasioned was probably more onerous than that which was required for the support of pauperism. The G. L. were also the greatest hindrances to the improvement of agriculture; and it has often been stated that from 3 to 5 hares eat and destroy as much as would keep 1 sheep. The destruction by game to crops was enormous.

But public opinion has effected a great change, notwithstanding the curious anomaly that the Game Act of 1831 and most of the other repressive G. L. still remain on the statute book. Poaching is now looked upon as not much more than an escapade, and, comparatively speaking, is but lightly punished. In a word, it may be said that the milder manners of the present age, the growing humaneness towards dumb animals, and the tendency to excuse offenders where no great moral iniquity characterises the offence have conspired to reduce the G. L. to a purely secondary place in the criminal system. The prin. Acts now in force are the Game Act, 1831; the Night Poaching Act of 1829 as amended by 7 and 8 Vict. c. 29; the Hares Killing Act, 1848; the Game Licences Act, 1860; and the Ground Game Act, 1880; besides certain Acts for the protection of wild birds. Broadly speaking, these Acts have for their object the restriction of the right either to kill or sell game, and, as incidental thereto, the punishment of those who infringe that exclusive right; the provision of close seasons for birds; and the regulation of game certificates and licences. It may be noted here that these Acts, by punishing trespass as a criminal offence, and inflicting penalties on those who infringe exclusive right of killing game, have

overcome the difficulty presented by the common law principle that there can be no private ownership in animals *ferae naturae* (i.e. in a state of nature) unless reclaimed or confined, or killed on one's land.

Game is declared by the Game Act of 1831 to include hares, pheasants, partridges, grouse, heath or moor game, black game, and bustards. Snipe, quail, land-rail, woodcock, and conies are not game, but they may only be taken or killed by certificated persons. Woodcock and snipe may be taken with nets or snares, and also rabbits, by the proprietor in an enclosed ground or by a tenant and his servant. The right to the game is vested in the tenant in all cases where it is not reserved to the landlord in his agreement with the tenant. Where the game is reserved the occupier can neither kill game nor give permission to another to do so.

Poaching or trespassing on the lands of another in search of game is, if committed in the daytime, an offence punishable summarily under section 30 of the Game Act, 1831, by a fine not exceeding £2. Trespassers may be required to quit the land, and give their names and places of abode, and in case of refusal may be arrested. Firing at game from a highway is a trespass in pursuit of game. The leave of the occupier of the land is no defence where the game belongs to the landlord or some other person, unless given prior to the trespass. These provisions do not apply to persons hunting, or coursing, or exercising a right of free warren, or to gamekeepers. An information for trespass may be laid by a common informer. Trespassers to the number of 5 or more acting together are liable to a penalty not exceeding £5. The law is more severe against poaching by night. Under the Night Poaching Act, 1829, as extended by an Act passed in 1844, any person unlawfully (i.e. having no certificate or licence) taking or destroying any game or rabbits by night, in any land open or enclosed, or on public roads or highways, gates, paths, outlets, or openings between such lands and roads or paths, or leading to enclosed gates; or any person either entering or being by night in such places, with any gun, net, engine, or other instrument, for the purpose of taking or destroying game, may be summarily punished for the first offence with imprisonment not exceeding 3 months, and at the expiration of such period be bound over for a year; for the second offence the above periods are doubled; and for the third offence penal servitude may be awarded to the extent of 7 years. Under the same Act, as similarly extended by the Act of 1844, if 3 or more persons by night unlawfully enter or are on any land for the purpose of taking or destroying game or rabbits, any of the party being armed with firearms or other offensive weapons, they shall be guilty of a misdemeanour punishable by penal servitude to the extent of 14 years. The Poaching Prevention Act of 1861 gives power to a constable to search

persons in public places whom they have good cause to suspect of coming from any land where they have been unlawfully engaged in pursuit of game; they may also search any cart or conveyance of the suspects, and seize game, guns, nets, and engines. By an Act passed in 1862, unlawfully taking or killing hares or rabbits in warren by night is punishable as for a misdemeanour; the punishment for the same offence committed in the daytime is a fine of £5. Unlawfully coursing, hunting, or killing deer in an unenclosed part of a forest is punishable by a penalty not exceeding £50 for a first offence, and, for a second offence, imprisonment not exceeding 2 years, which latter punishment also applies to a first offence where the deer were on any enclosed land. Strong measures to prevent trespassing or poaching may doubtless be adopted, but setting spring-guns, man-traps, or other engines calculated to destroy life renders the person so doing liable to penal servitude to the extent of 5 years.

A licence is required by every person who hunts or takes game, except persons (in Great Britain) taking woodcock or snipe with nets or springs; proprietors or tenants on enclosed land killing rabbits; persons hunting deer or hares with hounds; and others. Occupiers of enclosed land, or owners, having the right to kill game, may themselves kill hares, or authorise others to do so, without a licence, but such authority must be limited to 1 person at a time in any one par., and must be registered with the clerk of the petty sessions' justices. A gun licence is required even when the quarry is not legally game; but a game licence covers a gun licence. The charge for a licence taken out after 31 July, to expire on the next 31 July, is £3; to expire on 31 Oct. next ensuing, £2; for a licence taken out after 1 Nov., to expire 31 July, £2; and for any continuous period of 14 days, £1. See also CLOSE TIMES.

Game Reserves and Preserves, large tracts of country which have been set aside by gov. or other bodies for the preservation and protection of wild life native to those areas. In the U.S.A., Canada, Africa, Australia, and Malaya, in particular, care has been taken to estab. G. R. and P. See ALBERT PARK; BIG GAME; ELK ISLAND PARK; JASPER PARK; KENYA. **Divisions and Physical features** (for Tsavo and Nairobi parks); NATIONAL PARKS; YELLOWSTONE PARK; YOSEMITE PARK.

Gamelin, Maurice Gustave (1872-), Fr. en., educ. at St Cyr. Chief of staff to Gen. Joffre in the First World War from 1914 to 1916. Gen. of brigade and a divisional commander in 1917. Led a military mission to Brazil, 1918-25. Gen. of div., 1925. Commander of the Fr. forces in the Levant, 1925-8. Chief of staff of the Fr. Army, 1931-5. Inspector-gen., 1935-7. Vice-president of Higher Council of War, 1935. Chief of general staff of national defence, 1938. Commander-in-chief of the allied forces in France in the Second World War, 1939.

Sustained a colossal defeat by the Germans in June 1940. He was one of the defendants at Riom in a trial for treason and in 1943 was imprisoned. He was liberated by the Allies in 1945. His book, *Servir: Les Armées françaises de 1940* (pub. in 1946), is his defence against charges of having contributed to the disaster of 1940. While this proves that G. was not the advocate of a 'defence first' policy with which he was credited at the time, his apparent laxity of command makes the responsibility for the disaster of 1940 at least partially his.

Gamete, in biology, the sexual protoplasmic body, which unites with another for reproduction. Typically G.s consist of the ovum, a large cell containing nutritive material, and the spermatozoon, smaller and frequently active. The individual bearing the former is the female, the latter the male. See BIOLOGY; EMBRYOLOGY; EXPERIMENTAL EMBRYOLOGY.

Gametophyte, see PROTHALLUS.

Gaming. A wager or G. transaction involves a promise to pay money or something of value solely upon the determination of an uncertain event. The policy of the Eng. law is to render practically all such agreements unenforceable, the only substantial exceptions being the various commercial transactions relating to insurance and the purchase of shares on the Stock Exchange. The Gaming Act of 1845 makes all G. or wagering contracts null and void. By the Gaming Act of 1892 no one can recover under a contract in any form commission or reward promised him for making or paying bets on behalf of another. The effect of this Act is that if A employs B, a betting commissioner or turf agent, to make bets for him and loses, B cannot recover from A money paid to discharge such bets; again, if A obliges his friend B by paying his racing debts, he cannot recover the money from B; and again, if A lends B money, knowing that B is going to make bets with it, he cannot recover from B the money so lent. But if A makes bets for B and receives the winnings he can be compelled to pay them over to B; and, again, if A deposits money with B, a stakeholder, he can recover it from B at any time before B has actually paid it away on the determination of the wager. Securities such as promissory notes or bills of exchange given in payment of a bet are void as between the original parties to it, and a subsequent holder even for value cannot enforce such an instrument if it be shown that he knew of the illegal consideration for which it was originally given. Speculating on differences in the Stock Exchange falls under the Act of 1845 where it can be shown that the contract was a 'time bargain,' or mere gambling transaction (see DIFFERENCES). Contracts of marine insurance are perfectly valid where the person effecting the insurance had an *insurable interest* in the subject matter of the policy at the date of the loss; the result of this is that a cargo owner may recover on a policy entered into many days after his cargo has been

lost at sea, provided he was ignorant of such loss at the time he made the contract. See INSURANCE. For the Acts forbidding certain games as criminal offences see GAMBLING; and for the prohibition of lotteries see GAMBLING and LOTTERY. See C. F. Shoolbred, *Law of Gaming and Betting* (2nd ed.), 1935; and H. A. Street, *Law of Gaming*, 1937.

Gamma Rays, electromagnetic waves (q.v.) of very short wavelengths (c. 10^{-10} – 10^{-11} cm.), shorter even than those of X-rays (q.v.). They were discovered by Villard in 1900 as a third component of the radiation from some radioactive materials, the other 2 being alpha- and beta-particles (q.v.). He showed that they are not deflected by a magnetic field, and are therefore not charged particles. The rays are very penetrating, requiring many cms. of lead to stop them, and they produce a correspondingly small amount of ionisation. It has been shown that they are emitted by excited nuclei—a nucleus with more than its usual amount of energy emits some or all of the excess as a quantum (q.v.) of G. R. These quanta have discrete energies, i.e. the nuclei emit a line spectrum of G. R., showing that the nucleus can possess only certain energies of excitation. Nuclei can be excited in many ways, e.g. by being bombarded with protons or neutrons, or by electromagnetic waves of appropriate wavelength. Following a radioactive transformation, the product nucleus can be formed in an excited state and G. R. will then be emitted. G. R. are also produced when electrons of very high energy are rapidly slowed down in the neighbourhood of a nucleus—an example of Bremsstrahlung (see X-RAYS). The interaction of G. R. with matter is similar to that of X-rays, but for very short wavelength G. R. an important phenomenon is noted. When the G. R. quantum passes very near to a nucleus it can produce an electron pair, i.e. a negative electron and a positron (q.v.) or positive electron. The energy of the quantum must be greater than 1.02 MeV (see ELECTRON VOLT) which is the energy equivalent of the mass of the 2 particles, and any excess energy appears as kinetic energy of the electron pair. The positron is annihilated after about 10^{-10} sec. by combination with an electron to produce 2 G. R. quanta, or more rarely 1 quantum. Artificially produced radioactive isotopes that emit G. R., e.g. cobalt of mass number 60, find applications in radiotherapy, and for the detection of flaws in metal castings (see X-RAYS). See RADIOACTIVITY.

Gamondio, see CASTELLAZZO BORMIDA. **Gamut**, in music, originally the note (G) on the bottom line of the staff in the bass clef, but afterwards a system of notation by which the musical scale was shown divided into hexachords, i.e. groups of 6 notes named by the syllables later adopted by the tonic sol-fa method.

Gand, see GHEENT.

Gandak, or Great Gandak, Indian riv. which rises in the Himalaya in Nepal,

and is a trib. stream of the Ganges, joining that riv. at Patna. Its length is about 400 m., and it is known also as the Narayani.

Gandersheim, Bad, Ger. tn in the *Land of Lower Saxony* (q.v.), 38 m. SSE. of Hanover (q.v.). It was famous for some centuries for its abbey-school for the daughters of nobles. Pop. 2500.

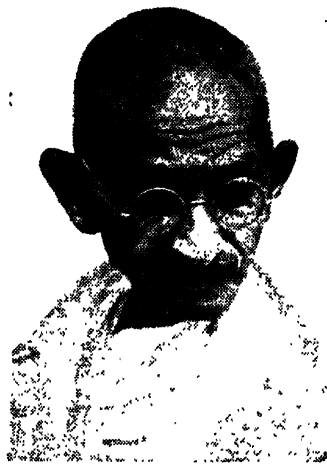
Gandharvas, one of the bands of semi-divine beings created in the beginning by Brahma. They were 6333 in number, and were b. 'imbibing melody.' There are different accounts of their origin. In later myth they are met with as the musicians of Indra's heaven, espoused to the *Apsarasas* (nymph-like beings). Man was the offspring of their unions. They have been identified with the Centaurs.

Gandhi, Mohandas Karamchand (1869-1948), commonly called Mahatma G., Indian Nationalist leader, was b. 2 Oct. at Porbandar, in the Kāthiāwār peninsula, on the coast of the Arabian Sea. His parents were of Bania caste and Jain religion. From early boyhood he was much concerned with a search for ethical and moral truth, and sought a synthesis of what appeared to him the best in all religious beliefs. Whether he ever found such a synthesis to his own satisfaction will never be known; but he certainly found an ethical guide to conduct which he applied to himself, though he could never expound it in dogmatic terminology.

In 1888 he arrived in England; he studied at the Univ. College, London, and was called to the Bar at the Inner Temple. He returned to India in 1891, and soon afterwards began practice in the supreme court of Bombay. In 1893 business took him to Pretoria. He resolved to stay in South Africa to support the cause of Asiatic immigrants, and he gradually abandoned his lucrative practice in Johannesburg. In 1899 he organised an Indian Red Cross for the Boer war. In 1903 he founded a paper, *Indian Opinion*, at Durban. He was prime mover in a great demonstration at Johannesburg, Sept. 1906, whereat the oppressive 'Asiatic ordinances' were denounced. During the African revolt in Natal in 1908 he organised, and served in, a corps of stretcher-bearers. For his political activities he was frequently arrested and imprisoned; even from extremists on his own side he suffered violence. The oppressive ordinances were removed in 1914; G. returned to India, and on the outbreak of the First World War came to London to organise an Indian ambulance corps. The attitude of the Brit. Gov. in India after the war entirely alienated him. He was the religious leader of the national movement till Tilak's death in 1920; he then became political leader by necessity. He proclaimed the *Harital*, or cessation of work of 6 April 1919, which was the precursor of the affair of Amritsar (q.v.). He supported the unrest of the Muslims provoked by the Allies' treatment of Turkey; and their Khilafat Committee, 1920, endorsed his non-co-operation policy. This consisted in denying and

ignoring the authority of the estab. Brit. Gov. The All-India Congress of Calcutta in that year approved the policy, which included the fostering of home industries, such as the use of the spinning-wheel.

The non-co-operation policy did not pursue the quiet course indicated by G.'s ethics. Strikes and riots were widespread in 1921, and in the same year, G. superintended the burning of foreign merchandise in Bombay. 'Civil disobedience,' the next step, involved non-payment of taxes—it began in Nov., when the Prince of Wales arrived. There was rioting and looting, so G. suspended the disobedience



MAHATMA GANDHI

E.N.A.

order. At the end of the year Congress invested him with dictatorial powers. More violence by Nationalists (at Gorakhpur) caused G. to abandon civil disobedience; but he was arrested and tried at Ahmedabad in 1922, and sentenced to 6 years' imprisonment for preaching disaffection. After an operation for appendicitis in prison he was released (1924), and for a while suffered apparent eclipse. Near the end of 1927 he returned to active politics and was enthusiastically received in Ceylon. After a visit to Burma he was in Aug. elected to presidency of Congress; but he declined it, leaving it to his lieutenant, Motilal Nehru (d. 1931). In Mar. and April 1930 he made his celebrated march from Ahmedabad to the sea, and formally violated the unpopular salt monopoly of the gov. by publicly distilling salt from sea water on the shore. He was arrested 5 May and sentenced to be kept in Yeravda Jail, near Poona, during the gov.'s pleasure. He was released again in Jan. 1931 to attend the

Round-table Conference in London. Two months later he concluded a truce with Lord Irwin, the viceroy. During further unrest in 1933 he was once more arrested and again released. The following year he announced that he wished to give up politics, and retired to his *ashram* or retreat at Wardha. But he was by now so identified with the nationalist movement in India, and had so captured the heart of India as a saintly leader that he was compelled, even in retreat, to give his constant counsel. He entered public life again in 1937 when he acted as mediator between the gov. and the Congress party on the issue of the assumption of office by the party in the provs.

The outbreak of the Second World War caused G. much distress. He had no doubt that Hitler was the aggressor and that Britain morally deserved full Indian support. But he convinced himself that only a 'free India' could render effective moral support to Britain, and his demand for 'complete independence' became even more insistent. The invasion of India by Japan faced him with a flat challenge to his belief in non-violence. That belief held firm and when the Cripps Mission (see INDIA, *History*) had reached a hopeful stage, G. threw his weight against settlement and the negotiations with Congress leaders broke down. At a moment when the war situation was unfavourable he opposed the draft declaration whereby India was promised autonomy, and demanded that the Brit. should 'quit India,' that the Indian Army should be disbanded, and that Japan should be allowed to enter India and arrange terms with a non-resisting people.

In Aug. 1942 he concurred in the Congress decision to organise mass obstruction against the war effort. This 'open rebellion,' as he himself called it, led to his arrest and that of other Congress leaders and to widespread disorder and bloodshed. G. was interned in the Aga Khan's palace at Poona and forbidden political contacts—though he was allowed the companionship of Mrs Gandhi, who d. in Feb. 1944. He was released unconditionally on medical grounds on 6 May 1944. Subsequently all the Congress leaders were released to take part in the protracted discussions arising out of attempts to determine the questions of independence and partition. A series of conferences between him and Mr Jinnah (q.v.) at the latter's house in Bombay were fruitless, for G. stated that he spoke only for himself and had no mandate from the working committee of the Congress. For many years in fact he had withdrawn from actual membership of the party, only to dominate it from without. In the negotiations in the spring of 1946 at Delhi with the Brit. Cabinet mission under Lord Pethwick-Lawrence, G. took a large share, mainly behind the scenes; and when at length, amid very serious outbreaks of communal violence, the plans of the mission led to the formation at Delhi of an interim National Gov., with Pandit Nehru as vice-president of the council, G.

remained outside the Cabinet. He continued, however, to be regarded as the ultimate national leader, and his views and advice were constantly sought.

When Independence Day came in 1947 sanguinary unrest in Calcutta led to fears that the partition of Bengal between the new dominions of India and Pakistan would have disastrous consequences. G. who had been travelling through E. Bengal and in Bihar preaching brotherhood, went to Calcutta, and in Sept. undertook a fast until normal conditions were restored. The party leaders exerted their influence over the people and on the fourth day G.'s fast ended. On 30 Jan. 1948 he was assassinated in Delhi on his way to an evening prayer meeting by a Hindu fanatic named Nathuram Vinayak Godse.

As a social reformer G.'s personality and purpose excited the widest interest throughout the world. More than a politician, he long figured as a prophet in revolt against the ideas of an age of machinery, of science, of more complex organisation, and of ever-increasing state control. To W. minds many of his political activities, and his dependence upon the support of Indian big business for political finance, appeared inconsistent with his avowed principles. But often as he seemed to change his mind on matters of detail, and adept as he was in political expediency and tactics, the burden of his message was the same: the repudiation of violence and the exaltation of the individual conscience. Fundamentally this part of his doctrine was a conviction, based, in his belief, on the purest forms of Hindu religion, that the innate goodness of the common man was the essence of all social and political organisation. This was in later years the inspiration of the campaign against 'untouchability' which lost him a multitude of supporters among the orthodox. Revered as a saint by millions of his countrymen, there were many, both inside and outside India, who were puzzled or irritated by the contrast between the wise, humorous, kindly, and courageous social reformer and the hair-splitting politician and demagogue. Yet all would acknowledge that he was the most influential figure India has produced for generations. See R. Rolland, *Mahatma Gandhi*, 1924; C. F. Andrews, *Mahatma Gandhi's Ideas*, 1929; E. Privat, *Aux Indes avec Gandhi*, 1934; K. Shridharani, *War Without Violence*, 1939; C. Heath, *Gandhi*, 1944; and L. Fischer, *Gandhi, his life and message for the world*, 1954.

Gandia, Sp. seaport in the prov. of Valencia, on the Mediterranean. It has an anct college, once a univ., a Gothic church, and the palace of the dukes of G. The busy port exports oranges, raisins, onions, and wine. Pop. 20,050.

Gandon, James (1743–1823), architect, b. London. Articled to Sir Wm Chambers (q.v.) and started practice c. 1764. Won the competition for the County Hall and Prison at Nottingham, erected 1770–2. Having been introduced to influential people in Ireland, he started practice in

Dublin, 1781, where he built the Custom House, 1781-91; the Parliament House (now Bank of Ireland), 1785; and the Four Courts, 1786-1802. He also designed the Court House and Gaol at Waterford, 1784.

Gandzha, see KIROVABAD.

Gangesha, or **Ganapati** (i.e. Lord of Hosts), name of a Hindu God, the son of Siva. His images represent him as a stout man with an elephant's head and 4 arms.

Ganges, riv. of N. India. This great stream is formed by the draining of the S. slopes of the Himalaya Mts. It rises in the Garhwal state and issues from an ice cave of the Himalaya, near Gangotri, 10,000 ft above the level of the sea. The riv. when it first issues forth is called the Bhagirathi. It is not until it is united with the Jahsari and the Alaknanda that the united stream is known as the G. The G., besides being the great riv. of India, is also an essential part of the Indian religious system. Both the source and the junctions of the rivs. are regarded as sacred spots by the Hindus. Emerging from the Himalaya Mts it turns to the SW. It can hardly, however, be regarded as a great riv. until at Allahabad it receives the Jumna, a stream which has its origin to the W. of the G. The junction of the Jumna and the G. is regarded by all Hindus as the holiest and most sacred of places, and is the scene of constant pilgrimages by the Hindus, who come there to wash away their sins. Other tribs. of the G. are the Gumti, Gandak, and Gogra. Opposite the confluence of the Gandak is the city of Patna, 140 m. E. of Benares. The riv. passes through the great city of Benares and then approaches the Bay of Bengal; 220 m. before reaching the shores of the bay it begins to spread out and form the delta. The main channel, which is called the Padma or Padda, flows in a south-easterly direction, and is met at Goalanda by the main stream of the Brahmaputra, and these 2 streams form a great estuary which is known by the name of Neghka, and which enters the Bay of Bengal at Moanhall. This great channel is the most easterly of all the channels of the delta. On the other side we find the Hugli, which is the most westerly of all the channels. The land which forms the delta is in the N. fertile and rich, but in the S. is swampy and goes by the name of the Sundarbans. The great commercial stream of the delta is the Hugli, on which stands the tn of Calcutta, which is about 90 m. from the sea-coast. Formerly steamer communication existed as far as the tn of Allahabad, but nowadays, owing to present-day facilities for traffic by rail and the increasing shoals in the riv., steamers go no farther than Calcutta. Often great changes take place in the riv.-bed; i.e. are thrown up, new channels are sought. Such changes are so rapid that it is dangerous for any large or permanent structure to be erected on the banks. The G. is crossed by 6 railway bridges as far as Benares, and another in E. Bengal has been erected. There are 2 canals—the

Upper G. Canal and the Lower G. Canal—which together with the Jumna irrigate the greater portion of the land between the G. and the Jumna above Allahabad. There is no important navigation on them.

Ganglion (Gk *gaglion*, swelling or excrescence): 1. In anatomy, an enlargement occurring in the course of a nerve, and containing bi-polar or multi-polar nerve cells as well as nerve filaments. Ganglia form subsidiary nerve centres. Two systems of nerves have ganglia upon them. First those of common sensation, whose ganglia are near to the origin of the nerve in the spinal cord. Secondly the sympathetic nervous system has various ganglia on various parts of it. In the invertebrates these ganglia are centres of nervous force and are distributed through the body in pairs.

2. In surgery, an encysted tumour, situated somewhere on a tendon.

3. In botany, the mycelium of certain fungi. Lymphatic G.—a lymphatic gland.

Gangotri, Hindu temple and place of pilgrimage in the Himalayas, close to the source of the Ganges. Pilgrims to this temple are supposed to be relieved of their sins.

Gangre, see ORE AND ORE DRESSING.

Gangrene (Gk *gagrainai*), or **Mortification**. G. is the condition in which putrefaction accompanies the death and degeneration of body tissues or of some of their constituent cells and is due to failure of arterial blood supply. G. may be either dry, that is mummified, or moist. Moist G. occurs from liquefaction of the gangrenous tissues by rapidly growing putrefactive bacteria. The cause of G. may be local, constitutional, or the 2 combined. It may be the result of changes in the vessel wall, as in senile G. of the old and feeble, and in certain diseases, such as diabetes, typhoid, measles, etc. Blocking of the arteries by emboli (q.v.) or thrombi (see THROMBOSIS) or by external pressure is another cause. For instance, a tourniquet left in position too long may cause G. Heat or cold (burns or frostbite), chemical agencies and bacillary affections, such as carbuncles, erysipelas, etc., may all cause G.

When the cause is removed, the gangrenous part separates. During the separation the affected parts should be kept aseptic, dry, and free from germs. In G. of a limb amputation is indicated when there is no prospect of a return of healthy blood to supply the part affected. A special form of G., known as Gas G., may occur when severely damaged tissues, particularly muscle, are infected with certain gas-forming bacilli. A highly dangerous and rapidly spreading form of G., Gas G. is a danger in war wounds when there is much tissue destruction and a deep penetrating wound. Also delay in treatment, which may be inevitable in war, favours the occurrence of Gas G. Better surgical technique, the use of antibiotics, and the performance of surgical operations on the actual field of

battle saved many lives in the Second World War, and the incidence of Gas G. was far less than in the First World War.

Ganja, see KIROVABAD.

Gannet, or *Sula bassanas*, web-footed, aquatic bird, a species of Sulidae. It is popularly called the Solan goose, and derives its specific name from the Bass Rock, one of its favourite haunts. It is solely an oceanic bird, with an easy and powerful flight; its entire length is about 3 ft. and the general colouring is white with a buff tinge on the head and neck; the bill is long and thick and compressed at the point. G.s are found nesting on



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GANNET

sev. rocky stations on the coast of the Brit. Isles, Ailsa Craig, St Kilda, Sulis-korri, and Grassholme (where it is estimated that there are over 6000 pairs belonging to the Royal Society for the Protection of Birds). In late autumn they migrate to North Africa. They feed on such fish as swim near the surface, herrings, pilchards, etc., diving swiftly and sometimes from a considerable height, upon their prey.

Ganshoren, suburb of Brussels, Belgium, N.E. of the city. Pop. 11,900.

Ganymede, son of Tros, king of Dardania, a Phrygian youth of surpassing beauty, who was carried by Zeus in the form of an eagle to heaven to serve as his cupbearer. Later Gk mythology represented him as the genius of the life-giving Nile, and anc. astronomers said he was Aquarius.

Gao, tn of Fr. Sudan, Fr. West Africa. It stands on the L. b. of the Niger, about 200 m. E. of Timbuktu direct, and by riv. nearly twice that distance. It was once

a prosperous tn, the cap. of the empire of the Songhais, and the ruins of the tomb of a Songhai leader, Mohamed Askia, are still to be seen. The Fr. estab. a military post here in 1900, and the new tn that has since sprung up has a pop. of 10,000. Mungo Park, Barth, and Houtat visited G. in the course of their explorations.

Gaol, see PRISON.

Gaol Delivery, see JAIL DELIVERY.

Gaol Fever, see JAIL FEVER.

Gaon (plural **Geonim**) properly signifies pride or majesty. In the hist. of Judaism G. was a title given especially to the heads of the Jewish academies of Sura and Pumbedita in Babylon. Sura was the senior academy, and the G. of Sura was recognised by the Babylonian court as the civil head of the Jews. During the Babylonian Gaonate there were 37 Geonim of Sura, beginning with Mar Rabbi Mar, AD 609, ending with R. Samuel ha-Kohen in 1034, and 50 Geonim of Pumbedita, from Mar ben R. Hanan in 589 to R. Hai in 1038. The age of the Gaonate was marked by an excellence in literary studies and an increase of culture, especially during the rule of R. Saadia, G. of Sura in 928. Studies were not confined to the Talmud, but one of the prin. works of the Geonim was replying to questions of ritual, submitted to them by Jewish congregations in distant communities. The traditions of the Gaonate survived in Damascus, where in 1170 the teachers there were spoken of as 'the scholastic heads of Israel.' The title was later given to outstanding religious authorities such as Elijah ben Solomon (1720-97), the 'Vilna Gaon.'

Gap (anc. **Vapincium**), Fr. tn, cap. of the dept of Hautes-Alpes, on the Luye, a trib. of the Durance (q.v.), 477 m. S.E. of Paris. It stands 2425 ft above sea-level, and is the seat of a bishopric. There is a trade in timber and livestock. Pop. 16,400.

Garamond, Claude (1480-1561), Fr. type-cutter. About 1541, in collaboration with Robert Estienne, he designed the famous Gk type named *Grecs du roi* (in recognition of the patronage of François I), which was first used in *Alphabetum Gracum*, printed by Robert Estienne in 1543. The present type face Garamond was designed by Jean Jannon.

Garat, Dominique Joseph (1749-1833), Fr. politician and writer, b. near Bayonne. In 1790 he was a member of the Constituent Assembly whose debates he reported in the *Journal de Paris*. He won literary distinction by his *éloges* on Fontenelle and other famous Fr. writers, taking sev. prizes awarded by the Fr. Academy. G. became minister of justice during the early days of the Fr. Revolution, and it was he who told Louis XVI that the convention had condemned him to the guillotine. Under Napoleon he was ennobled and also became a senator and president of the institute; but he lost office on the restoration in 1815.

Garbett, Cyril Forster (1875-1955), prelate, educ. at Portsmouth Grammar School and Keble College, Oxford; was

vicar of Portsea, 1909-19; appointed bishop of Southwark, 1919, and of Winchester, 1932. He became archbishop of York in 1942. His custom of regularly travelling through the rural parts of his dioceses on foot endeared him to the people. G. was one of the Church's leading spokesmen in the House of Lords on the Church's attitude to social and international problems. Amongst his publications were *The Church and Social Problems*, 1939, *The Church and Social Problems in Peace and War*, 1940, *The Claims of the Church of England*, 1947, *Church and State*, 1950, *In an Age of Revolution*, 1952.

Garbo, Greta (Greta Louisa Gustafsson) (1905-), Swedish actress, b. Stockholm. At the age of 14 she entered a dept store. Took up dancing. Attended a dramatic school attached to the Royal Theatre, Stockholm. Began film career, 1922, appearing in *The Attonement of Gosta Berling* under the direction of Mauritz Stiller and changing her name to Garbo. Then went with Stiller to Hollywood and starred in many films which brought her world-wide fame, including *Mata Hari*, *Anna Christie*, *Queen Christina*, *Anna Karenina*, *Marie Walewska*, *Camille*, and *Ninotchka*. She has become a film legend in her lifetime and was given a special Academy Award in 1954.

Garborg, Arne (1857-1924), Norwegian novelist, playwright, and poet, the most important writer of the *Landsmaal* movement, and the president of the *Norske Samlaget*, a literary society formed in 1868 for the propagation of the *Landsmaal* (New Norse) as a literary language. His first important novel *Bondestudenten*, 1883, gives an interesting picture of Norwegian life at the time. His later novels are *Kolbotnbroen*, 1890, and *Traette Maend*, 1891. As a dramatist he won some success with *Laeraren*, 1896, *Den burkonne faderen*, 1899, and *Heimkomin son*, 1908. His 2 verse cycles *Haugtussa*, 1895, and *I Helheim*, 1901, rank among the masterpieces of Norwegian literature. See R. Thesen, *Arne Garborg* (3 vols.), 1933-6, *Ein diktar og hans strid*, 1947; J. Dale, *Studiar i A. Garborgs sprak og stil*, 1950.

Garaño, Pedro Antonio Correia (1735 or 1724-72), Portuguese poet, lived a sequestered life near Lisbon till, in his thirty-sixth year, he was thrown into prison, perhaps because some of his writings had offended the autocratic gov. There he d. In most of his dramas, sonnets, odes, satires, and epistles he was avowedly imitating classical models, and in the last 2 he has assuredly proved himself 'the Portuguese Horace,' a title given also to Ferreira. The purity of his taste and style undoubtedly lifted the national literature out of the mire of decadence into which it had fallen, but G. must be described as a writer of conscientious refinement rather than as a genius. See T. Braga, *Arcaidia Lusitana*, 1899.

García I, Sp. king, reigned over Navarre from 885 to 905. His reign was darkened by continual warfare against the Moors.

García II, the Trembler ('El Tembloroso'), ruled Navarre from 924 to 970. His surname was due to a physical infirmity, and in the active part he took in the struggles between Leon and Castile he proved a worthy successor to the warlike Sancho.

García III, king of Navarre from 1035 to 1054. He was the eldest son of Sancho II the Great. Defeated and killed in the battle of Atapuerca, his kingdom passing to Ferdinand's nephew, Sancho IV.

García IV, ruler of Navarre from 1134 to 1150. When Alphonso the Battler, the emperor, foolishly bequeathed Navarre to the Knights of St John, and Aragon to the Templars, the Navarrese, refusing a foreign yoke, chose G. Ramirez, a scion of the old royal stock, to be their king.

García, Manuel (1775-1832), Sp. vocalist and composer, was famous among his contemporaries for his splendid and artistic singing, and is still remembered as a great teacher. At first a chorister in the cathedral of Seville, he appeared successively in his own and other musicians' operas in Cadiz, Madrid, Paris, and London. After a profitable tour in America (1825) he was robbed of all his wealth whilst on his way to Vera Cruz. For the remainder of his life he taught his art in Paris, using the excellent system advocated in his *Metodi di Canto*. The numerous stage works he composed are forgotten. His son, Manuel Patricio Rodríguez G. (1805-1906), was no less famous as a teacher than his father. He was prof. at Paris Conservatoire, 1842, and Royal Academy of Music, London, 1846; and also inventor of the laryngoscope (1855). His daughters, Maria Malibran (q.v.) (1808-36) and Pauline Viardot (1821-1910), were also very famous singers. See M. Sterling Mackinlay, *García the Centenarian*, 1908; and J. M. Leven, *The García Family*, 1932.

García Calderón, Ventura (1883-), considered one of the best writers that Sp. South America has produced, b. in Peru. He is the son of a former president of Peru, who preferred imprisonment and exile to the shame of signing a treaty that he considered dishonourable for his country. As a result, the son has lived a large part of his life in France and Spain. In his books he writes of Peruvian native subjects in the Sp. language, but with a grace he has partially borrowed from the Fr. His best-known vols. are *The Vengeance of Condor*, *Danger Death*, and *Colour of Blood*, all of which are collections of short stories.

García Lora, Federico, see LORCA.

Garcilaso de la Vega (c. 1503-36), Sp. poet and soldier, b. Toledo; became at the age of 17 guardsman of Charles V, and from 1532-4 served Don Pedro de Toledo, the viceroy of Naples. Wounded during the Tunis expedition of 1535, he met his death the following year whilst storming a small fort in Muz during the retreat from Marseilles. He is the finest pastoral poet of Spain, and with Bocca, his friend, shares the honour of having popularised the It. hendecasyllabic verse.

His finest poem is the first of his 3 eclogues, penned in Naples under the inspiration of Virgil's tomb. Only a few odes and sonnets are included in his scanty remains, but they are fine enough to enrol him among the classics. He was the author of that great sonnet which begins 'O dulces prendas por mi mal halladas.' See study by H. Keniston, 1922, who also ed. his *Works* (New York), 1925; M. Arce Blanco, *G. de la Vega*, 1930; R. Lapesa, *La trayectoria poética de Garcilaso*, 1948.

Garcilaso the Inca (1539-1616), as he called himself, was a Sp. historian, son of Sebastián G. de la Vega and a princess of the royal line of Incas. B. at Cuzco in Peru, he early (c. 1580) migrated to Spain and passed most of his life at Córdoba, where a chapel in the cathedral bears his name. Considering his intimate knowledge of his native language, his Peruvian hist., entitled *Comentarios Reales que tratan del Origen de los Incas reyes, que fueron del Perú*, 1609-17, is disappointing. See study by J. Fitzmaurice-Kelly, 1921.

Gard, dept of S. France, formed of part of the anct prov. of Languedoc. It has a short coastline on the Mediterranean, and is watered by the Rhône and its tribs. the Cèze, the Ardèche, and the G. In the NW. are ridges of the Cévennes, of which Mont Aigoual is 5120 ft high, whereas the S. is low, with marshy plains yielding salt. The Garrigues in the SW. are forested limestone hills. The dept suffers from the mistral (q.v.). Olives, vines, mulberries (for silk-worms), fruit, and cereals are produced in great quantities, and cattle are raised. There is much mineral wealth, including coal, iron, lignite, copper, zinc, and lead, and there are metallurgical, silk, leather, and oil industries. The prin. tns are Nîmes (the cap.), Alès, and Le Vigan (qq.v.). Area 2270 sq. m.; pop. 396,750.

Gard, Pont du, celebrated Rom. aqueduct in France, crossing the R. Gard 16 m. W. of Avignon. Built by Marcus Agrippa (q.v.) in 19 bc to bring water to Nîmes (q.v.), it has 3 tiers of arches, one above the other. It is 902 ft long and 160 ft high. See E. Esparandieu, *Le Pont du Gard et l'aqueduc de Nîmes*, 1929.

Garda, Lake of (It. Lago di Garda; anct Lacus Benacus), It. lake, lying mainly between Lombardy and Veneto (qq.v.). At its N. extremity, which is in Trentino-Alto Adige (qq.v.), it is fed by the R. Sarca from Alpine glaciers. From the S. end of the lake the R. Mincio (q.v.) issues. G. contains 4 small ls., and its area is 143 sq. m. It is 32 m. long, and 2-11 m. broad. The N. shores are mountainous; in the NE., in particular, the lake is overlooked by the precipitous grey cliffs of Monte Baldo. The climate is Mediterranean, and vines, olives, and citrus abound. Since early times the lake has been famous for its beauty; it has been praised by, amongst others, Catullus, Virgil, and Dante. Tns on its banks include Riva, Peschiera, and Sirmione (qq.v.).

Garde Nationale of France, a body of armed citizens, organised in Paris in 1789 for civic defence. In 1795 they helped to put down the Parisian mob, and in the revolutions of 1830 and 1848 supported the revolutionaries. In 1871 they were dissolved by Parliament.

Garden Art. The first gardens were made when the early nomadic tribes settled down on an approved spot, surrounded themselves and their herds with a hedge as a protection against wild beasts, and within their enclosure planted vegetables and fruit trees for their sustenance. Little art was used in their formation, but planting in regular rows was recognised as a useful measure in order that the plants should receive the attention they required. Anct tablets from Egypt show orderly rows of sycamore, fig-trees, and date-palms under cultivation for their enjoyable shade, profitable fruits, and wood. That flowers were grown for pleasure is indicated by a representation in a Theban tomb of early date of beds of cornflowers, poppies, and papyrus growing by the side of a canal. Parks of trees with cared-for paths and bushy undergrowth were instituted by the Babylonians, who also invented about the 9th cent. the 'hanging gardens of Semiramis'—one of the wonders of the world—a series of terraced gardens supported by strong arches. The acclimatisation of foreign trees in his own land began with Tiglath-Pileser I, c. 1100 bc. The early gardens of Greece were strictly utilitarian, consisting of vegetable beds, and our modern pot-gardening began when the votaries of Adonis sowed in earthen pots fennel, lettuce, wheat, and barley—plants which sprang up soon and as quickly withered, thus symbolising the early violent death of the beautiful youth. The gymnasiums of early times were finely ornamented with park grounds, and were later constructed with the addition of baths. Both in Greece and in Italy fountains, water-works, and statuary have always played a leading part in the formation of a garden; and in Spain and France these are also important. The wonderful water devices in the ruined garden of the Villa d'Este at Tivoli still reflect in some measure the marvels of the Renaissance. In England during the early part of the Christian era useful plants constituted the gardens, while the rose and lily were regarded as being heathenish plants; later they became the symbol of Mary and the reward of martyrdom. During the Middle Ages ladies of the household used to attend to the gardens, having learned from the monks the art of growing healing herbs among their vegetables (an early garden was called *Ortus sanitatis*, the place of health). Flowers were planted in the grass; clipped trees, arbours of roses and honeysuckle, turf seats, and outdoor baths added to the later pleasures of gardens; and meals in the open air became popular.

Among great garden artists or architects were Rainaldi, Le Blond (who worked for Peter the Great), Boyceau

(Fr. Renaissance garden artist and architect of the Versailles garden), André Le Nôtre (q.v., 17th-cent. Fr. garden artist, who worked at Versailles and Vaux-le-Vicomte), Léon Battista Alberti (It. Renaissance), Bramante (It. Renaissance), Lancelot Brown (q.v., Eng. landscape garden artist), Sir Joseph Paxton (who laid out the Chatsworth gardens), and Winckelmann. England has learned much from other countries in the making of gardens—as her Dutch sunk gardens show, and the oriental influence at work in

clipped trees and shrubs and statuary are very little used. *See also* GARDENING; LANDSCAPE GARDENING. For a full, illustrated, scholarly work consult *A History of Garden Art* by M. L. Goehe, trans. by L. Archer-Hind and ed. by W. P. Wright, 1928; G. Gromort, *L'Art des jardins*, 1934; and H. F. Clark, *The English Landscape Garden*, 1948.

Garden Cities were originated by Sir Ebenezer Howard (q.v.) in his famous book of 1898. He proposed, as a corrective to the overgrowth of cities and rural



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LETCHWORTH GARDEN CITY

the pagoda at Kew—but in naturalness she is supreme; the unrivalled lawns with herbaceous borders, or rock borders planted with alpine flowers, are part of her glory. Hampton Court, Kew Gardens, Hyde Park, and Regent's Park all supply beauty and inspiration to dwellers in London; and among exquisite private gardens are those at Sandringham in Norfolk, Chatsworth in Derbyshire, Aldenham House in Herts, The Pleasance in Overstrand, Norfolk, and Wisley Gardens in Surrey. America has vast national parks and also charming domestic gardens; they are usually enclosed by hedges, vines on lattice screens, or masses of informal plantings; climbing vines on porches and walls are popular;

decline, and as a measure of land reform, the building of new towns of limited size (32,000–58,000), surrounded by permanent agric. belts, completely planned to provide houses, workplaces, and all urb. facilities near together, their whole sites to be held in trust for the public so that increments of land value should benefit the community. A limited-dividend company, First Garden City Ltd., was founded in 1903, acquired a site at Letchworth (q.v.) in Herts, 35 m. from London, and estab. a town on this model. Despite shortage of capital and public scepticism Letchworth has proved a social and financial success, with a great variety of industries, and at Jan. 1957 a pop. of about 22,000. Though the

company's self-imposed limit on profits has recently been removed, the original intentions have been adhered to. As an experiment in a new principle of healthy and economic urb. development, Letchworth Garden City created world-wide interest, though for many years the principle was misunderstood and confused with the idea of city extension by 'garden suburbs' (see below) or open housing development. Howard himself started in 1920 a second new tn, Welwyn Garden City (q.v.), also in Herts, 21 m. from London, of which it was described as a 'satellite town.' Profiting by the earlier experience and imposing a stronger architectural control, Welwyn has been even more attractively planned and an equal social and economic success. It also has a wide range of industries and a pop. at Jan. 1957 of about 27,800. Welwyn was taken over by a gov. corporation in 1948 under the New Towns Act.

In both the G. C. the great majority of inhab. are employed locally and many workers come in also from adjoining rural areas, whose prosperity they have much enhanced. These 2 demonstrations that the building of new self-contained tns in country dists. is practicable as a means of relieving the congestion and limiting the growth of great cities have had a profound effect on the evolution of Brit. planning policy, and the principle is now being attentively studied in many other countries. See GREEN BELTS; NEW TOWNS; TOWN AND COUNTRY PLANNING; also books listed under NEW TOWNS, and C. B. Purdom, *The Garden City*, 1913, and *The Building of Satellite Towns*, 1949; F. J. Osborn, *New Towns after the War*, 1918 (new ed. 1942), and *Green-Belt Cities*, 1946; *Town and Country Planning*, Sept. 1953 (Letchworth Jubilee issue).

Garden Suburbs and Garden Villages. Before the garden city movement, some excellent housing estates, openly laid out, were built by industrial firms, notably Bournville (Birmingham), Port Sunlight (Birkenhead), and New Earswick (York). These were carefully planned, controlled under the leasehold system, and laid out with gardens at low densities (7-10 houses an ac.) and good community facilities; they have much influenced later housing practice. Similar methods of planning and control have been applied to many residential suburbs in Great Britain and abroad; Hampstead Garden Suburb is a notable example. All these differ from G. C. and new tns in that they are not complete self-contained tns isolated from others by green belts. Sev. municipal corporations have built well-planned garden suburbs on city fringes; outstanding examples are Wythenshawe (Manchester), Speke (Liverpool), and the out-co. housing estates of the London Co. Council. Though in the main dormitory suburbs, some also provide industrial zones and a measure of local employment, and where this happens they are usefully termed 'quasi-satellites' to distinguish them from new tns proper.

Garden of the Gods, dist. of Colorado, U.S.A., NW. of Colorado Springs. It covers about 500 ac., and is remarkable for its strange and extremely beautiful formations of eroded sandstone, some of which resemble in form cathedral spires, etc. It is a tourist centre.

Gardenia, family Rubiaceae, genus of about 60 species of evergreen shrubs or trees of tropical Africa and Asia. *G. jasminoides*, of China and Japan, is much grown under stovehouse conditions for its pure, white, salver-shaped, fragrant flowers, and has sev. varieties. New plants are propagated from cuttings every 2 to 3 years, and with ample heat and moisture, the plants grow readily. The double form, variety *florida*, is much esteemed.

Gardening. Development of G. in Britain and America since the latter part of the 18th cent. has been rapid and almost continuous. It was not checked either by the First World War or by the Second World War as were many other branches of art and industry. Both wars did, however, change its direction. War-time demands for economy and home-raised food led, in each case, to increased efforts to grow vegetables and fruits in home gardens and on allotments. Increasing taxation and labour stringencies were reflected in a reduction of large private estates or their amenities. In the Second World War gov. direction of horticult. cropping and their sponsored 'Dig For Victory' campaigns led to a great decline in flower cultivation and ornamental G., but a vast increase in the ranks of gardeners. The human need for beauty is irrepressible, and the indications are that ornamental G. on more labour-saving and less spacious lines than in the past is now finding new and greater expression. The ever-growing awareness of the need for open spaces, municipal parks, gardens, and playing-fields only serves to emphasise the increasing and valuable part that G. now plays in national life.

History.—G. has been pursued from the earliest ages of which records exist. Nor should it be assumed that the art of the pre-Christian era was mean and crude. Egyptian, Assyrian, Babylonian, and Persian monarchs had skilled gardeners in their service long before the days of Virgil. Auct Egypt, auct Greece, auct Rome, all had beautiful gardens. Persepolis and Palmyra, Babylon and Nineveh, Thebes and Memphis, Bagdad, to name but a few great tns of the past, were famous for their parks and gardens. It is probable that Gk and Rom. G., which in due course spread its influence and gave its lessons to W. Europe, derived in the main from the Near and Middle E., but the Far E. must not be overlooked, because gardens were also cultivated in India and China from very early times. The Romans were the chief agents concerned in introducing G. into England, and they instructed the early Britons in the growth and use of many vegetables and fruits hitherto unknown to them. When the Romans were compelled to leave

Britain G. languished, but it revived under the influence of the monks after Christianity had been introduced, and a considerable variety of vegetables and medicinal herbs, together with many fruits, were grown. Flower cultivation was little practised at first, but in the 3 centuries which followed the Norman Conquest there were developments in ornamental culture, and in the Middle Ages gardens gradually increased around the palaces, castles, and granges; walks, terraces, steps, balustrades, summer-houses, statues, lakes, and fountains, etc., being formed. Labyrinths became popular.

The Renaissance brought a remarkable development in ornamental G., both in France and Italy, and its influences spread to Britain; they were, however, formal. Topiary work, i.e. clipping yews, etc., into fantastic shapes, came into fashion. Even in the 18th cent. formalism reigned, and it was left for Addison (essay in the *Spectator*, 1712), Pope (essay in the *Guardian*, 1713, and *Epistle on Taste*, 1731), Whately (*Observations on Modern Gardening*, 1770), and Horace Walpole (*Essay on Modern Gardening*, 1785) to condemn the monotonous repetitions of the formal school. Pope, aided by the famous gardener Kent, carried his principles into practice. The latter, with Bridgeman and 'Capability' Brown, estab. the Eng. or natural system. Briefly this is an imitation of nature: the most beautiful trees, shrubs, and flowers for the space required being arranged in as natural and happy a combination as possible. Later, Chambers, Knight, Loudon, and others did good service, while in quite modern times Robinson, Veitch, Wilson, Farrer, Kingdon Ward, Forrest, and others exercised great influence as gardeners, writers, or introducers of new plants. (See also GARDEN ART).

Layout.—While some operations can be carried out in large gardens which are impossible in small ones, it may be assumed that most gardens have sufficient space for a flower garden, a kitchen garden, and a lawn of greater or less size. Except in very small gardens ornamental trees and shrubs should be used as freely as possible. Roses should be planted in beds and on walls, arbours, and fences. A rockery, large or small according to space and means, is an attractive feature, and a pool for water-plants can often be associated with it to advantage. Shrub borders are valuable for their permanence and labour-saving. Herbaceous borders are still popular, though the tendency is to introduce flowery shrubs and Polyantha roses to save labour. In small gardens anns. and biennials, raised from seed, are excellent, while bulbs for autumn and spring planting provide beautiful flowers with little trouble.

Shelter.—Most gardens are more or less enclosed. If hedges form boundaries, they are ornamental in themselves when kept trimmed. Yew, holly, beech, hornbeam, hawthorn, privet, box, Lawson's cypress, thuya, and *Lonicera yunnanensis* are good subjects for boundary hedges.

Laurels and privet are too troublesome, except for larger gardens. For internal low hedges, barberries, escallonias, lavender, *Lonicera nitida*, rosemary, sweet briar, and veronica are suitable. Walls should be decorated with some ornamental plant or trained fruit tree. Actinidias, roses, clematis, honeysuckle, and wisteria are ready choices, but even a N. wall will favour winter jasmine, Virginian creepers, kerria, or ivy. Fences may similarly be made ornamental.

Paths.—For hard wear in all weathers paths may be of stone, bricks, concrete, macadam, or gravel, but occasional paths within the garden may be of grass. All hard paths should be made on foundations of 4-8 in. broken brick or stone, with 2 in. of ash or sand, on which to lay the final surface, finished with a slight crown or slope to one side ($\frac{1}{4}$ in. per foot width) for drainage. The surface of gravel paths may be fixed with a cold bitumen product. An ann. dressing of weed-killer keeps paths free from greenness. Edgings of metal, stone, or bricks are best to keep a walk in place. Plant edgings are only good for occasional paths, and here dwarf box is right.

Lawns.—As the base ground or carpet against which flowers and ornamental plants are seen at their best, well-kept turf is an essential feature of most gardens. A lawn may be made from turf or seed. In either case the soil should be adequately prepared, drained, levelled, cultivated, and fertilised beforehand. A lawn from turf is best laid between Sept. and Feb. Good sods are cut 12 in. wide, 1 in. thick, and 1 to 3 ft long, from heath moorland, parkland, or sea-washed marsh turf. Laying is done in a forward direction, with a board on the new-laid sods, which are alternated to overlap at the joints. Lawns from seed are best made in early Sept., or April for second choice. The finest lawns are made with such grasses as Cheving's Fescue and New Zealand Browntop or Bent, but the seed mixture should be made up to suit (1) the soil, (2) the situation, and (3) the purpose of the lawn. To sow evenly at 1-2 oz per sq. yd. divide seed into 2 lots, mix with an equal bulk of dry sand, and sow a sq. yd. at a time, sowing one way with one lot of seed, and crosswise with the other. Protect from birds by a network of black cotton thread on sticks. A light rolling when the grass is 2 in. high, followed by a high cut, removing no more than 1 in. of grass blades, and a sifting of rotted organic matter as a top-dressing, will give the sown lawn a good start. The management of existing turf may be based as follows: autumn—top-dress with sharp sand and finely broken charcoal. Winter—aerate thoroughly by spiking or piercing turf mat with spiking tool or fork. In Feb., top-dress with soil compost (2-3 parts, by bulk, good loam, 1 part rotted organic matter, 1 part sand) at 1-2 lb. per sq. yd. Spring—apply complete lawn fertiliser in Mar. Use weed-killers from April to June. Selective hormone herbicides (MCPA or Methoxone, DCPA or

2:4-D) destroy plantain, star-weed, self-heal, cat's-ear, dandelion, and many common weeds. Lawn sand is best for daisy and clover. Summer-mowing frequently, and with not too close a cut, strengthens grass growth and inhibits weeds best. Moss implies diminishing soil fertility, poor drainage, or matted turf. Applying a mercurised eradicator or a 10 per cent solution of tar-oil wash kills moss in winter, but basic causes must be removed for permanent improvement.

Trees and Shrubs.—Forest trees belong to the estate or park, and such species as sycamore, chestnut, alder, beech, sweet chestnut, ash, walnut, tulip-tree, plane, poplar, oak, lime, and elm are best excluded from the small garden. Here, a choice should be made from birch, thorns, laburnum, magnolia, prunus, cherries, almond, peach, crab-apple, rowan and service trees, dogwood, and willows, which have foliage, floral, bark, or berrying colour to offer. Evergreens such as holly, strawberry-tree, *Azara microphylla*, and laurels are useful for screening. Conifers need to be planted judiciously in a country where so many of them are foreign. The native yew and juniper seldom come amiss. It is among the cypresses, cedars, retinosporas, and thuyas that pleasing conifers of suitable stature and shades of green are to be found, while pines and spruces supply miniatures for the rock garden. Shrubs combine permanence with floral and colourful grace, and are increasingly planted for their labour-saving virtues. They may be planted singly, in groups, in borders, or in combination with herbaceous flowers. A list of the popular species according to their flowering season would include: Winter—*Elaeagnus* sp., *Jasminum nudiflorum*, *Erica darleyensis*, *E. carnea* and varieties, *Viburnum fragrans*, *Chimonanthus praecox*, *Hamamelis mollis*, *Lonicera standishii*, *L. fragrantissima*, *Prunus davidiana*, *P. kansuensis*, *Viburnum tinus*, *Camellia sasanqua*, *Clematis calycina*, *Azara microphylla*, *Cornus mas*, *Daphne mezereum*, *Garrya elliptica*, *Corylus* sp. Spring—*Magnolia stellata*, *M. conspicua*, *Forsythia* sp., *Prunus cerasifera*, *Erica medieterranea*, *E. veitchii*, *Ribes* sp., *Corylopsis* sp., *Daphne blagayana*, *Stachyurus* sp., *Rhododendron* sp., *Prunus persica* and varieties, *Berberis* sp., *Prunus lannesiana* and varieties, *P. serrulata*, *P. avium*, *Pieris* sp., *Viburnum carlesii*, *Osmanthus delavayi*, *Azaleas*, *Malus* sp., *Cytisus* sp., *Syringa* sp., *Ceanothus* sp., *Laburnum* sp., *Cistus* sp., *Helianthemum* sp., *Spiraea* sp., *Philadelphus* sp., *Genista* sp., *Deutzia* sp., *Lonicera* sp. Summer—*Kalmia latifolia*, *Zenobia pulverulenta*, *Buddleia* sp., *Styrax japonica*, *Viburnum tomentosum* and varieties, *Fabiana imbricata*, *Escallonia* sp., *Daboecia polifolia*, *Erica cinerea* and varieties, *E. tetralix*, *E. mackayi*, *E. ciliaris*, *Spartium junceum*, *Genista aetnensis*, late *Ceanothus* sp., *Lavandula* sp., *Veronica* sp., *Olearia haastii*, *Clethra* sp., *Euonymus glutinosa*, *Hydrangea* sp., *Erica vagans*, *Yucca* sp., *Clematis jackmanii*. Autumn—*Hibiscus* sp., *Olerodendron fargesii*, *Perovskia*

atriplicifolia, *Caryopteris* sp., *Romneya* sp., *Colletia armata*, *Fuchsia* sp., *Abelia* sp., *Hoheria populnea*, *Fatsia japonica*, *Salix bockii*; and for their berries—*Cotoneaster* sp., *Malus* sp., *Pyracantha* sp., *Pernettya* sp., *Skimmia* sp., *Berberis* sp., *Rosa* sp., *Sorbaria* sp., *Arctostaphylos* sp., *Sambucus* sp., *Rhus* sp.

Herbaceous Borders.—There is nothing better suited to skirt a lawn than a border of hardy herbaceous perennials. No matter how small the garden it can be provided, the point being to adapt the selection of plants to the area available. Herbaceous (i.e. non-shrubby) plants vary greatly in height and spread; some require only a sq. foot of space each, others a yd or more. While large plants should not be put into small borders, small plants may be used for the front areas of large borders, as in many cases they are very beautiful and also easily grown. The following selection of plants will be useful in either case, because the plants marked 'middle' and 'back' are suitable for such positions in large borders, whilst those marked 'front' will come in handy for the front areas of large borders and the main area of small ones.

Achillea ptarmica. The Pearl (front).
Aconitum (monkshood) (front). Root poisonous.
Alstromeria (front). Very graceful.
Anchusa (front).
Anemone, poppy and Jap., the latter the taller, but both front.
Anthemis (front).
Anthericum (front), very graceful.
Aquilegia (columbines) (front).
Armeria (middle).
Artemisia (middle).
Asters (Michaelmas daisies), alpinus and ericoides (front, most middle and back).
Astilbe (back).
Bocconia cordata (back).
Boltonia (back).
Campanula (most front).
Catananche (front).
Celsia (front).
Centaurea (back).
Chrysanthemum, koreanum, maximum, and leucanthemum (middle or back).
Cimicifuga (back).
Coreopsis lanceolata and *grandiflora* (front).
Delphinium nudicaule, *cardinale*, and Blue Butterfly (front, most back).
Dicentra (front).
Doronicum (front). Early bloomers.
Echinops (middle).
Eremurus (back).
Erigeron (front).
Eryngium (sea holly) (middle and back).
Funkia (front).
Gaillardia (front).
Galea (back).
Geranium sanguineum and *pratense* (front).
Geum (front).
Gypsophila paniculata (gauze flower) (middle and back).
Helenium (front).
Helianthus (sunflowers) (most back).
Heliopsis (back).
Helleborus (Christmas and Lenten roses) (front).

Hemerocallis (day lilies) (front).
Heuchera sanguinea (front).
 Hollyhocks (back).
Hyacinths (front).
Inula glandulosa (front).
Iris (front).
Kniphofia or *Tritoma* (red-hot poker) (middle).
Linaria (front).
Lobelia cardinalis and *fulgens* (front or middle).
Lupinus polyphyllus, hybrids and varieties, splendid (middle).
Lychnis chalcidonica, *L. Viscaria splendens plena*, etc. (front).
Lythrum (middle).
Meconopsis Wallichii, *nepalensis*, and *Bailei*, beautiful poppies (front or middle).
Mimulus (front).
Monarda (bergamot) (front).
Narcissi (front).
Oenothera (evening primrose) (front).
Paeonia, magnificent (front).
Papaver, perennial poppies (middle or even front), also *nudicaule* (front).
Pentstemon (front).
Phlox (middle).
Phlox, one or two dwarf varieties, such as Mont Blanc, front, most middle. Invaluable plants.
Physalis franchetii (winter cherry) (front).
Platycodon (middle).
Polemonium (front).
Polygonatum (front).
Potentilla (front).
Primula sp. (front).
Pulmonaria (front).
Pyrethrum (front). Brilliant colours, early bloomers.
Rodgersia (back).
Romneya (back).
Rudbeckia (front or middle, in rich soil).
Salvia (middle).
Scabious, including *caucasica* (front).
Scutellaria (front).
Sedum spectabile (front).
Senecio (middle to back).
Sidalcea (back).
Solidago (golden rod) (back).
Filipendula hexapetala and *rubra* (back); *palmata* and *purpurea*, with their varieties (front).
Stachys (front).
Statice latifolia (front).
Thalictrum minus (Maidenhair-like) (front).
Tiarella cordifolia (front).
Trollius (front).
Uvularia (front).
Valeriana (middle).
Verbascum (middle to back).
Veronica, sev. species (front).
Viola (front).

For full descriptions see *Everyman's Encyclopaedia of Gardening*.

Clearly, there is no lack of hardy herbaceous plants suitable for small borders. Empty spaces can be filled with anns. and biennials. Squat plants like double daisies, pansies, polyanthi, primroses, and bulbs such as snowdrops, narcissi, scilla, and tulips, and corms such as crocus and gladioli may be used to lend added colour. Most soils can be made suitable

for herbaceous plants. Light soils need rotted organic matter (dung, compost, leafmould, peat, shoddy, etc.). Heavy soils are improved by draining, liming, and incorporating dryish organic litter (peat, compost, hop manure, etc.). An ann. dressing of organic manure should be given in autumn or early winter. If herbaceous plants are to prosper they must be lifted and divided every 2 or 3 years, usually in autumn, or spring. The centre and older part of the lifted plant is discarded, the younger, more vigorous outer parts being retained for replanting and propagation.

Rock Gardens.—Although there is much potential interest and charm in a rock garden, its construction requires skill, its planting care, and its maintenance regular attention. The ideal site is sunny, yet with partial shade during the day. It is easier to build on a natural slope than on the flat, which presents difficulties in blending a raised rock garden with the garden as a whole. Good drainage is essential for alpine plants, and on heavy soils a good bed of rubble or hard core should underlie the construction. A rock garden should represent a natural stone outcrop in miniature. It may incorporate a ravine, stream, or scree. The stone used should be chosen from sedimentary rocks—Westmorland, Cumberland, or Cheddar limestone, or a good sandstone; not igneous granite, gabbro, or basalt. Two principles should guide the placing of rocks; the strata of the rocks must run in the same plane with the graining parallel, and joints between stones should be at right angles; the exposed rock should be sunk well into the soil, to suggest a preponderant mass of stone underneath. The soil should be reasonably, but not too fertile, and well rammed about the stones. Planting pockets and crevices are best filled with soil compost to suit the chosen plants. A good basic mixture is 1 part by bulk loam, 2 parts each sand and leafmould, plus 2 handfuls of bonemeal per barrowful. For lime-loving plants add a handful of crushed chalk or limestone dust. Calcifuge plants may need extra leafmould or peat. Alpine plants dislike wet around their necks, and a collar of limestone chippings is often helpful to drainage. Others, chiefly those with downy leaves, should be given the protection of small glass cover in winter. Alpine plants are now generally sold *ex pots*, and so planting can proceed at almost any time of the year, weather conditions permitting. Many alpine can also be raised from seed without much trouble. The following list includes selected species of good character. Fuller descriptions and information on culture will be found in *Everyman's Encyclopaedia of Gardening*.

Acaena microphylla, etc.
Achillea clavennae, *lewisii*, *tomentosa*.
Aethionema × *Waxley rose*.
Alyssum saxatile, *serrulifolium*.
Andromeda polifolia compacta.
Androsace carnea, etc.

Anemone apennina, blanda.
Anthyllis montana.
Antirrhinum asarina, sempervirens.
Aquilegia akitensis, glandulosa, etc.
Arabis sp.
Armeria caespitosa.
Asperula suberosa.
Aster dumosus × *Novi-Belgii.*
Aubrieta deltoidea varieties.
Calceolaria tenella.
Campanula sp.
Cassiope lycopodioides.
Ceratostigma griffithii.
Corydalis lutea, nobilis.
Crocus sp.
Cyclamen coum, hiemale, europaeum, etc.
Dianthus sp.
Eranthis hyemalis.
Erica carnea, cinerea, tetralix, vagans.
Erinus alpinus.
Frankenia thymifolia.
Galanthus sp.
Gentiana sp.
Geranium argenteum, farreri, etc.
Helianthemum alpestre, vulgare, etc.
Iberis sp.
Incarvillea grandiflora.
Iris sp. (dwarf bulbous types).
Leontopodium alpinum (edelweiss).
Linaria sp.
Linum alpinum, etc.
Lithospermum diffusum.
Muscari sp.
Myosotis rupicola.
Narcissus sp. (miniatures).
Omphalodes cappadocica.
Onosma albo-roseum, echioides.
Papaver alpinum.
Penstemon sp.
Phlox sp. alpine.
Polemonium confertum.
Polygala chamaebuxus.
Potentilla nitida.
Pratia angulata.
Primula farinosa.
Primula × *Garryarde* varieties.
Primula × *Juliana* varieties.
Itamondia myconi, etc.
Ranunculus sp.
Saponaria ocyroides.
Saxifraga sp.
Sedum sp.
Sempervivum sp.
Silene acaulis.
Soldanella alpina, pusilla, etc.
Stokesia cyanea and varieties.
Thlaspi rotundifolium.
Thymus sp.
Tulipa kaufmanniana, etc.
Veronica sp.
Viola cornuta, gracilis, etc.
Wahlenbergia sp.

Annual Flowering Plants.—In common with other classes of flowers, anns., hardy and tender alike, have undergone considerable development during recent years, particularly in the cases of sweet peas, clarkias, godetias, asters, stocks, and snapdragons (not strictly anns. but generally treated as such). The development of sweet peas has been remarkable, and the number of varieties is now enormous, while cultivation as an exhibition flower has led to what is called cordon

training, the plants being grown on single stems like cordon fruit trees. As regards most hardy anns., however, the older time-honoured principles of cultivation apply to-day, fertile deeply tilled soil, thin sowing, and subsequent timely thinning of the seedlings, so that the plants cannot get crowded and thereby become attenuated. Nevertheless, failures are not infrequent, because many growers sow too early in spring while the soil is still cold. However good and however finely raked the soil, however thin the sowing, failure is probable unless the soil has been warmed up by adequate spring sunshine. This applies to chalky as well as to clayey soils, because chalk does not warm up quickly. Sowing may be earlier, as a rule, on sandy loams than on either clay or chalk; in any case, local conditions should be considered. The class known as half-hardy anns. is best sown in pots, pans, or shallow boxes and shaded with glass and paper till germination has taken place, then gradually inured to light on a greenhouse shelf or near the glass in a frame. Abundance of air, careful watering (strictly avoiding excess), and timely pricking-out 3 to 4 in. apart in other boxes should then ensure sturdy and healthy plants, suitable for putting out in the garden when summer weather comes; or, at will, potted singly for greenhouse decoration. The following are selections of hardy and half-hardy anns.; detailed descriptions will be found in *Everyman's Encyclopaedia of Gardening*.

Hardy Annuals

<i>Abronia umbellata.</i>	<i>Lavatera rosea.</i>
<i>Adonis.</i>	<i>Leptosiphon.</i>
<i>Agrostemma coeli-</i>	<i>Limnanthes doug-</i>
<i>rosea.</i>	<i>lassii.</i>
<i>Alyssum, Sweet.</i>	<i>Linaria, in var.</i>
<i>Blumenbachia.</i>	<i>Linum grandiflorum</i>
<i>Calendula.</i>	<i>Love-in-a-mist.</i>
<i>Candytuft, many</i>	<i>Love-lies-bleeding.</i>
<i>vars.</i>	<i>Lupins, in var.</i>
<i>Chrysanthemum,</i>	<i>Malope grandiflora.</i>
<i>many vars.</i>	<i>Mignonette, in var.</i>
<i>Clarkia, many vars.</i>	<i>Nasturtiums, in var.</i>
<i>Collinsia bicolor.</i>	<i>Nemophila insignis.</i>
<i>Convolvulus major.</i>	<i>Night-scented stock</i>
<i>Convolvulus minor.</i>	<i>Phacelia campanu-</i>
<i>Coreopsis drummon-</i>	<i>laria.</i>
<i>dii.</i>	<i>Poppies, in var.</i>
<i>Cornflower.</i>	<i>Salvia, Blue Beard.</i>
<i>Eschscholzia, many</i>	<i>Saponaria, in var.</i>
<i>vars.</i>	<i>Scabious, in var.</i>
<i>Evening primroses.</i>	<i>Silene, in var.</i>
<i>Godetia, many vars.</i>	<i>Sunflowers.</i>
<i>Gypsophila elegans</i>	<i>Sweet peas.</i>
<i>Helichrysum jaco-</i>	<i>Sweet sultans.</i>
<i>baea.</i>	<i>Virginian stock.</i>
<i>Larkspurs, many</i>	<i>Viscaria.</i>
<i>vars.</i>	

Half-hardy Annuals (or plants commonly treated as such)

<i>Antirrhinum</i> (Snap-	Asters,	Chinese,
dragons), many	many types and	
vars.	vars.	
<i>Arctotis grandis.</i>	Balsams.	

Half-hardy Annuals (or plants commonly treated as such)—Cont.

Carnations, Mar- guerite.	<i>Nemesia</i> , in var.
<i>Celosia</i> .	<i>Nicotiana affinis</i> and <i>Sanderae</i> .
<i>Coemsa</i> or <i>Cosmos</i> , in var.	Pansies, in var.
<i>Dimorphotheca</i> <i>aurantiaca</i> .	<i>Petunia</i> , in var.
<i>Dianthus</i> (Indian pink), in var.	<i>Phlox drummondii</i> , in var.
<i>Eccremocarpus</i> <i>scaber</i> .	<i>Rhodanthe helip- terum</i> (Everlast- ings).
<i>Gaillardia</i> , in var.	<i>Salpiglossis</i> .
Golden Feather.	<i>Schizanthus</i> , in var.
<i>Helipterum</i> (ever- lastings).	<i>Statice sinuata</i> .
<i>Lobelia</i> , in var.	Stocks, many types and vars.
Maize, coloured.	<i>Tagetes signata</i> <i>pumila</i> .
Marigolds, Fr. and African, in var.	<i>Verbena</i> , in var.
<i>Mimulus</i> , in var.	<i>Zinnia</i> , single and double, in var.

Biennials such as wallflowers, foxgloves, Canterbury bells, forget-me-nots, Brompton stock, and sweet williams, suitable for sowing outside in May or June to flower the following year, should also be used.

Roses.—Wherever the atmosphere is reasonably pure, and the soil fairly substantial, roses can be grown successfully. A light dry soil is distinctly unfavourable, although some of the rambling Wichuraisana roses will thrive in shallow chalky ground if well fed at the surface. The deeper, richer and more substantial the soil, the more likely roses are to thrive year after year. In poor ground frequent renewal will be necessary. Another great factor in maintaining health is to keep the plants free from injurious insects and fungi. Shelter without shade is desirable. Any time in open weather between Nov. and Mar. is suitable for planting. On the whole bushes are more satisfactory than standards for beds, although the latter have their uses. Liberal use should be made of rambling roses for walls, fences, arbours, and pillars, and polyantha roses for bedding.

Kitchen Garden.—Productivity of a garden, especially the kitchen garden, rests on maintaining and improving soil fertility and structure. The 3 essentials are (1) organic manuring, (2) liming, and (3) fertilising.

Under cultivation the organic soil content is lost more quickly than it is replaced. In light soils this means loss in moisture-retentiveness; in heavy, loss in aeration; in all soils loss of humus, the chief reservoir of plant foods. The soil needs at least once every other year a dressing of organic manure. In the scarcity of farmyard and stable manure substitutes must be used, such as leafmould, peat, hop manure, shoddy, and compost. Organic compost consists of organic refuse (plant remains, leaves, mowings, etc.) and household refuse (kitchen waste, vacuum cleaner dust, etc.), scientifically rotted with an accelerator of decomposition. A common method is to heap the material in layers like a sandwich; thickish layers of

mixed organic debris being interleaved with an accelerator (dung, nitrogenous chemical mixture, or proprietary compound), sprinkling of soil and lime, and left 4–12 months to decompose. Such compost is roughly equivalent to good farmyard manure, and a compost heap should be a permanent asset in every garden.

With few exceptions, notably rhododendrons, certain ericas, cranberries, strawberries, and raspberries, garden plants thrive best when there is adequate calcium (lime) in the soil. Lime also liberates other plant foods, and improves soil structure by causing the particles to flocculate. Sour clay soils benefit greatly from liming, so do acid sands, silt, and peat. Also some crops need more lime than others. Onions, beets, celery, spinach, brassicas, lettuce, and leafy greens need a well-limed soil. Peas, beans, carrots, sweet corn, and runner beans need a moderately limed soil. Potatoes, tomatoes, turnips, marrows, cucumbers, and melons need very little or no lime except when grown in most acid soils. The type of lime used influences the amount. Ground limestone or chalk is used at rates of 1–2 lb. per sq. yd.; ground burnt lime or quicklime at $\frac{1}{2}$ –1 lb. per sq. yd.; and hydrated lime at $\frac{1}{4}$ –1 lb. per sq. yd. The latter can be applied at any time of the year. Other limes are best applied in autumn or winter. Fertilisers are necessary to make good soil deficiencies and to get increased yields. Briefly, fertilisers are designed to supply 3 major plant foods: nitrogen, phosphorus, and potash. The common nitrogenous fertilisers are: Inorganic or chemical—sulphate of ammonia (20.6 per cent), nitrate of soda (16.0 per cent), nitro-chalk (15.5 per cent); Organic—dried blood (12–14 per cent), hoof and horn meal (14 per cent). Phosphatic fertilisers: Inorganic—superphosphate of lime (17–18 per cent), basic slag (9–18 per cent), triple superphosphate (40–48 per cent); Organic—steamed bone flour (27.5 per cent), bone meal (20–24 per cent). Potassic fertilisers: Inorganic—muriate of potash (50–60 per cent), sulphate of potash (48.5 per cent), kainit (14 per cent), potash salts (20–30 per cent), wood ash (3.5–6 per cent). Certain fertilisers contain more than one element, notably guano (10–14 per cent nitrogen, 9–11 per cent phosphorus), meat meal (3–7 per cent nitrogen, 9–16 per cent phosphorus), and fish guanoes (9–14 per cent nitrogen, 9–20 per cent phosphorus). Inorganic fertilisers are quickly exhausted; organic fertilisers tend to have residual effects for 2–4 years. The essence of good fertilisation is to combine chemical carrying the 3 major elements to suit the needs of the crop and the soil in which it is grown. Such combinations are known as 'complete' fertilisers. In practice, deficiencies of other elements, many known as trace nutrients, may occur, and other chemicals be used to correct them. Borax, for instance, is used to correct a boron deficiency. In the well-tended garden, however, unusual soil

deficiencies are rare. One-sided exhaustion of the soil, and susceptibility to insect pests and diseases in the kitchen can be minimised by crop rotation. — practice, this means that like vegetables of the same plant family do not follow one another on the same ground. For instance, peas should not follow beans; tomatoes potatoes, cabbage cauliflower,

sev. years. It is also permissible for swedes or turnips to follow carrots, since they are of different plant families. Insect pest and disease control are important aspects of vegetable growing, require some knowledge of their character, so that proper preventive of remedial measures can be taken. The chief preventive is good culture which



YELLOW TURK'S CAP LILY

Lilium pyrenaicum, one of the earliest lilies to bloom. Although it has a heavy strong smell, and has newer and more showy rivals, the peculiarly bright greenish-yellow flowers with their dark vermillion anthers make it very pleasing.



ENGLISH GARDEN PINKS

From the earliest days the *Dianthus* has lived up to an old description as 'a genus furnishing plants of the herbaceous flowery ornamental order.' From left to right, descending: laced pinks; Delight (race of pinks); *alwoodii* (the perpetual flowering pink); Alpine pinks; show pink; village pinks; Scotch pink.

Drawings by Miles Hadfield from 'The Gardener's Companion.'

and so on. For a 4-year rotation the plots are four. No. 1 plot is cropped with potatoes; No. 2 with peas, beans, onions, leeks, celery; No. 3 with root vegetables; No. 4 with brassicas and saladings; the 1st year. In 2nd year No. 1 is cropped as for No. 2; No. 2 for No. 3; No. 3 for No. 4, and No. 4 for No. 1. In subsequent years the cropping is rotated similarly, until by the 5th year the rotation begins again, as for the 1st year. There are some exceptions to rotation. Perennial crops, like asparagus, and onions may be grown on the same soil for

fosters vigorous growth, robust health, and resistance in the plant. A short calendar of operations for the year follows.

January.—Rough-dig all vacant ground when opportune. Lay stiff clay in ridges to be frosted. Wheel on organic manure, and spread. On sheltered border and in favourable weather make sowings of round peas and broad beans, and plant shallots and horseradish. Under glass start tomatoes, cucumbers, and melons in heat. Prepare hot-beds for early crops and mushroom. Sow in boxes in frames leeks, onions, lettuce, and radish. Force

rhubarb, chicory, seakale. Sow spinach and plant out lettuce under cloches. Make up seeds order. Treat vacant slug-infested ground with dry powdered Bordeaux mixture (1 lb. per 20 sq. yds.).

February.—Continue winter cultivations when possible. Use aldrin to defeat wireworms. Lime and slow-acting fertilisers, such as bone mē

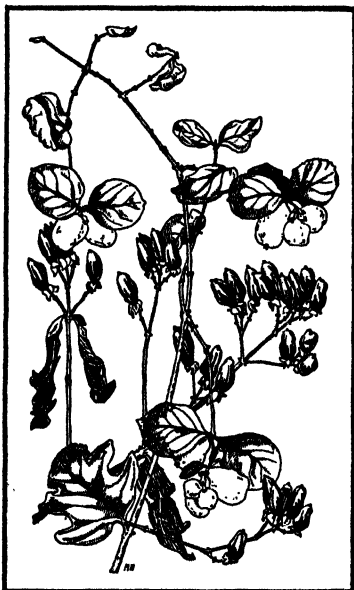
cabbage, kale, kohlrabi, etc.), spinach, onions, peas, leeks, turnips, carrots, and vegetables generally. Under glass in heat start celery, celeriac, angelica, marrows, capsicum, cardoon, and tomatoes for outdoors. Divide artichoke roots. Clean and mulch asparagus bed. Transplant autumn-sown onions.

April.—Weed seed-beds. Hoe fre-



AUTUMN FLOWERS

Crocus speciosus, so called from the showy orange stigmata, has the merits of being beautiful and hardy as well as plentiful; *Cyclamen hederifolium*, hardy autumn flowering, is not so widely known as it should be; and ivy, *Hedera helix* variety *conglomerata*, a small, slow-growing bush of deep green colour.



WINTER BERRIES

The snowberry, *Symphoricarpos rivularis*, has been called the 'aspidistra of the shrubbery,' because of its tolerance of bad conditions. Its odd little flowers and white berries are attractive. *Hypericum elatum* is one of the few tall members of the genus; its dark fruits follow many small waxy flowers.

basic slag, hoof and horn, etc. Put up seed potatoes in boxes in light, frost-proof quarters to sprout. Outdoors sow broad beans, parsnips, thyme and pot herbs, and parsley. Plant garlic, Jerusalem artichokes, and divide chives. In frames with gentle heat sow celery, onions, leeks, lettuce, Fr. beans, mustard and cress, and early cauliflowers. Plant out autumn-sown lettuce under cloches. Place cloches over early strawberries.

March.—Prepare seed-beds out of doors, and fertilise with complete fertiliser 7-10 days before sowing. Outdoors sow brassicas (Brussels sprouts, cauliflower,

quently. Prepare marrow beds, celery trenches, and plant asparagus. Make successional sowings of saladings, brassicas, roots, etc. Sow beet late in month. Under glass start sweet corn, marrows, runner beans, etc. Prevent onion fly with calomel dust, flea beetles with D.D.T., and slugs with crushed metaldehyde and food bait (bran). Thin out seedling crops, and prepare beds for transplanted brassicas.

May.—Complete potato planting. Stake peas. Protect tender crops from wind. Watch for late frosts on clear nights after sunny days. Outdoors sow

runner beans, Fr. beans, beet, sweet corn, and successions of peas, saladings, etc. Sow colewort and cabbage for autumn-cropping. Earth-up potatoes. Begin planting out marrows, tomatoes, and cucumbers late in month. Transplant maincrop brassicas for winter-cropping, and leeks. Check early aphides with nicotine or derris insecticide. Use quick-acting fertiliser, such as dried blood, nitrate of soda, to feed leafy crops. Cut asparagus. Train cucumbers under glass.

June.—Hoe to control weeds, but mulch growing plants to conserve moisture, using rotted compost, peat, sawdust, etc. Plant out cabbage, tomatoes, ridge-cucumber, marrows, and capsicums out of doors. Sow vegetables and saladings for succession. Cease cutting asparagus. Continue earthing-up potatoes. Sow parsley for winter use, and early peas for autumn cropping. Prevent cabbage-root fly with calomel dust. Dust brassicas with derris or D.D.T. to prevent caterpillar attacks. Control thrips on peas with nicotine. In greenhouse, ventilate to keep even temps. Shade glass in very hot weather.

July.—Cultivate ground cleared of early crops, and prepare for winter greens. Mulch against drought. If you must water use a weak liquid manure solution. Sow turnips and beets after peas. Feed celery, globe artichokes, etc. Stake outdoor tomatoes. Take up shallots and garlic. Sow runner beans, early cabbage, prickly spinach, and salads for succession. Lift early potatoes. Spray maincrops with copper fungicide to prevent blight. Cut herbs for drying.

August.—Sow spring cabbage, cauliflower, kale, endive, winter lettuce, yellow turnip, colewort, and onions for overwintering. Lift early beets and carrots for storing. Earth up celery. Spray potatoes again against blight with copper fungicide. Disbud tomatoes and restrict to 4 trusses out of doors. Cut down globe artichokes and mulch with manure. Bend over tops of maturing onions. Under glass make sowing of Fr. beans, tomatoes, and cucumbers for winter fruiting.

September.—Lift and ripen off onions. Begin harvesting potatoes, roots, etc. Dry herbs. Earth up leeks and celery. Lift chicory for blanching. Prevent weeds seeding. Transplant lettuce in frames for winter. Under glass sow quick-maturing carrots. Thin spinach. Plant out endive, spring cabbage. Sow corn salad in frames. Use derris and D.D.T. to deter caterpillars on brassicas. Dust with sulphur against mildews.

October.—Complete harvesting and storing of roots and potatoes. Lift salsify and scorzonera. Trench and humus-manure vacant ground. Sow cauliflower for wintering in frames. Under cloches sow lettuce (May King, Cheshunt Early Giant). Replant watercress beds. Remove decaying foliage of brassica crops from soil promptly. Make up compost heaps of plant debris. Make first sowing of broad beans in south.

November.—Early digging and trenching of vacant ground should go hand in hand with organic manuring and liming. Treat pest-infested soil with soil fumigant. Plan next year's rotation. Broad beans (Seville and Claudia Aquadulce) and round peas may be sown. Lift asparagus for forcing. Plant horseradish. Cover seakale and rhubarb with organic litter for forcing.

December.—Plant perennial vegetables, such as seakale, asparagus, etc. Protect celery from frost. Divide mint bed. Look over stored potatoes, carrots, etc., periodically, and remove diseased tubers; treat with synthetic hormone product to prevent premature sprouting. Clean up vegetable plots; hoe spring cabbage, etc.; overhaul potting shed and equipment. Rough-dig vacant ground. Under glass sow early horn carrots. If heat available begin sowing tomatoes for next summer cropping.

Fruit.—Fruits succeed on a wide range of soils given good root aeration and adequate but not too free drainage. Heavy soil needs to be lightened by use of basic slag or lime and organic material. Light soils need liberal manuring, mulching, and special attention to potash content. Aspect should be open, preferably southerly. Site must be frost-free. Fruit does better on hillside or slope than in valleys or frost pockets. Modern tree fruits are grown on selected rootstocks which modify growth and fruiting habit. Standards, planted 20-40 ft apart, and half-standards, planted 18-25 ft apart, are best for orchards, specimen planting and long yields. For small gardens pyramid and bush trees, planted 12-15 ft apart, and cordons, planted 2-3 ft apart are best. In stone fruits, trained wall trees are best, not cordons. Apricot nectarine, and peach are usually grown as trained wall trees, but as bushes in warm dists. Medlars and nuts, planted 10-18 ft apart, are useful. Soft bush fruits, such as currants and gooseberries, need 4-6 ft apart, raspberries are planted 2-3 ft apart in rows 6-8 ft apart, and blackberries, loganberries, and other hybrid berries are trained on wire fences 10-12 ft between plants, and 6 ft between rows. Strawberries are best planted separately, 12-18 in. apart, in rows 2-3 ft apart. Planting of all fruits can be done from Nov. to Mar. in mild open weather. Trees should be staked at time of planting; soil rammed firm around their roots; and a mulch of organic litter applied.

Manuring.—A good general plan is annual application of organic manure (dung, compost, hop manure, etc.), especially to raspberries, strawberries; application of bone meal (2-3 oz per sq. yd) or basic slag (4-6 oz) every 2nd or 3rd year; to all fruits. Dessert apples, red currant, and gooseberries need potash most, and should get 1½ oz sulphate of potash and 1 oz sulphate of ammonia per sq. yd in Mar. Cooking apples, pears, raspberries, Bramble fruits, and strawberries need 1 oz sulphate of potash and 2 oz

sulphate of ammonia; while stone fruits black currants, and nuts respond to $\frac{1}{2}$ oz sulphate of potash with 2 oz sulphate of ammonia per sq. yd in spring.

Pruning.—It is impossible to detail the various systems of pruning followed here, but the basic principle for fruit-tree pruning is severe pruning encourages shoot or wood growth, light pruning encourages development of fruiting wood. It follows that where new wood growth is wanted, as in training trees in early years, pruning should be severe. This is also true in the case of the trained trees of Morello cherry, apricot, and peach, where new wood is needed each year to replace old. But once the framework of apples, pears, plums, sweet cherries has been built up, pruning should be light to encourage bearing. Generally, the weaker the year's growth the harder it may be pruned in winter. Summer pruning consists of tipping leading shoots in Aug. to help new wood to mature. Bearing trees generally need light pruning, thinning of crossing branches, and removal of dead wood. Care is needed as some trees bear on the tips of young shoots. Red currants are pruned like apples or pears. Black currants are pruned by removing about a third of the oldest branches at their base each year, letting new shoots take their place. Gooseberries may be pruned like black currants, or, like red currants, especially if cordons. Raspberries are pruned by cutting away the fruited canes at the soil level each Nov. Non-fruiting apples and pears often respond to bark-ring (removal of narrow $\frac{1}{4}$ in. ring of bark in 2 half circles, 2-3 in. apart) in May. Plums, damsons, and stone fruits which fail to crop may respond to root-pruning, the roots being bared around the trees in winter, and all coarse roots 2-3 ft from the stem severed.

Spraying.—Adequate control of insect pests and fungus diseases depends upon preventive spraying. All tree and bush fruits should be sprayed with a winter wash (tar oil, D.N.C. petroleum oil, or thiocyanate) while dormant, to kill eggs of aphides, etc., and to clean trees of moss and lichen. In spring there should be at least one pre-blossom and one post-blossom application of lime-sulphur or captan to control scab and other fungus diseases, to which may be added an insecticide (B.H.C., D.D.T., or nicotine) to control such pests as caterpillars, capsid bug, etc., in apples and pears. Black currants need lime-sulphur in early April to destroy big bud mite. Derris, nicotine, lonchocarpus dust, and petroleum oil are used for contact control of insects in summer, while karathane fungicides are used for mildews.

Choice of Fruits.—Fruit varieties are propagated vegetatively. It is important to begin with healthy, vigorous stock of good strain from reputable growers. **Apples:** Dessert—Tydeman's Worcester, Beauty of Bath, Worcester Pearmain, Epicure, James Grieve, Ellison's Orange, Lord Lambourne, Cox's Orange Pippin, Blenheim Orange, Laxton's Superb Winter

King. **Culinary**—Emneth Early, Grenadier, Golden Noble, Lane's Prince Albert, Bramley's Seedling, Lord Derby, Edward VII, Crawley Beauty. **Pears:** Dessert—Clapp's Favourite, Laxton's Superb, Williams's Bon Chrétien, Beurré Superfin, Dr Jules Guyot, Beurré Hardy, Conférence, Durondeau, Doyenné du Comice, Winter Nellis. **Culinary**—Beurré Clairgeau, Pit-maston Duchess, Vicar of Winkfield, Catillac, Uvedale's St Germain. **Apricots:** Breda, Moorpark, Royal, Shipley's. **Cherries:** (plant in pairs) Elton Heart and Florence; Early Rivers and Waterloo; Bigarreau Napoleon and Governor Wood; Black Tartarian and Elton Heart. Bigarreau Schrecken and Monstrueuse de Mezel; Belle d'Orléans and Frogmore Early. **Plums:** Blaisdon Red, Belle de Louvain, Czar, Denniston's Superb, Early Laxton, Jefferson, Kirk's Blue, Victoria, Purple Pershore, Giant Prune, Transparent Gage. **Damsons:** Merryweather, Farleigh. **Black Currants:** Boskoop Giant, Mendip Cross, Seabrook's Black, Baldwin, Tiple X, Cotswold Cross, Victoria, Davison's Eight. **Red Currants:** Laxton's No. 1, Raby Castle, Laxton's Perfection, Fay's Prolific. **White Currants:** White Dutch, White Transparent. **Gooseberries:** Careless, Lancer, Whinham's, Warrington, Whitesmith, Lancashire Lad, Leveller. **Raspberries:** Lloyd George, Norfolk Giant, Pyne's Royal, Red Cross, Malling Promise, Golden Hornet. **Straubberries:** Royal Sovereign, Paxton, Tardive de Léopold, Giant Prolific.

Market Gardening, including French Gardening.—Increased pop., and consumption of fruit and vegetables, and the food situation during and after the Second World War have encouraged great developments in commercial cultivation. With competition from imports from abroad increasing, however, successful market gardening with economical and intensive cultivation demands skill, knowledge, and first-class equipment. With adequate glasshouses, Dutch lights, and cloches the skilful home grower can produce quality food, and should be able to bring produce to maturity early enough for profitable returns. Capital outlay for a 10-ac. holding is between £3000 and £4500. At least one year should be spent working on an existing holding, and it is wise to take one year's instructional course at a co. farm institute beforehand. Site, soil, water supply, accessibility, and markets are the important considerations to be studied. Fr. G. demands considerable equipment, and cap. outlay may approach \$1500 per ac.

See also BOTANY; BULBS; FERNS; FLORA; FLOWERS; FLOWER SHOWS; FRUIT; GARDEN ART; GRAFTING; HERBS; HOTHOUSE; HYDROPONICS; INSECTS; LAWN; LOAM; PLANT HORMONES; PLANTS; PRUNING; SHRUBS; SOIL; VEGETABLES; WINDOW GARDENING.

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1935; E. J. Salisbury, *The Living Garden*, 1935; G. C. Taylor, *The Modern Garden*, 1936; M. Hadfield (ed.), *The Gardener's Companion*, 1936; M. B. Crane and W. J. C. Lawrence, *The Genetics of Garden Plants*, 1939; N. B. Bagenal, *Fruit Growing*, 1939; R. Bush, *Fruit Growing Outdoors*, 1946; and *Frost and Fruit-grower*, 1945; A. J. Simons, *Vegetable Grower's Handbook*, 1945; J. L. H. Chase, *Cloche Gardening*, 1946; Constance Spry, *Flowers in House and Garden*, 5th ed., 1948; S. B. Whitehead, *The Winter Garden*, 1948, *In Your Kitchen Garden*, 1948, *In Your Flower Garden*, 1948, and *Garden Weeds and Their Control*, 1949, *Gardener's Earth*, 3rd ed., 1952, *Fruit from Trained Trees*, 1954; and *Everyman's Encyclopaedia of Gardening* (revised from W. P. Wright), 1957.

Garderobe (Fr.), normally a term for a wardrobe; but, in architecture, a privy built into the wall of a medieval castle, e.g. at Orford Castle, Suffolk.

Gardiner, Alfred George (1865-1946), journalist and essayist, b. Chelmsford, Essex. He wrote under the pen-name 'Alpha of the Plough.' He was editor of the *Daily News* from 1902 to 1919. His *Prophets, Priests and Kings*, 1908, is a series of caustic character sketches of contemporary celebrities, notably politicians. It was followed in 1913 by *Pillars of Society* in a similar vein and by *War Lords* in 1915. He produced a biography of Sir Wm Harcourt in 1922, and one of George Cadbury, formerly proprietor of the *Daily News*, in 1923. He also pub. some vols. of essays.

Gardiner, Samuel Rawson (1829-1902), historian, b. Ropley, Hants, and educ. at Winchester, Christ Church, Oxford, at Edinburgh, and at Göttingen. He was elected fellow of All Souls' College, Oxford, in 1884, and of Merton in 1892. He held the position of prof. of modern hist. at King's College, London, until 1885. He was granted a civil list pension in 1882. G. set the example for a new school of historians who confined themselves to facts, putting aside the partisanship and brilliant rhetoric which added literary interest, but tended to detract, historically, from the histories of his immediate precursors. He threw a new light on the Stuart period, to which he devoted years of patient research, often among documents hitherto unstudied, and his work still forms the basis for modern historical scholarship on the period. His works include *The Thirty Years' War*, 1874, *History of England from the Accession of James I to the Outbreak of the Civil War*, 1883, *History of the Great Civil War*, 1893, and *Oliver Cromwell*, 1899. See H. B. Learned, S. R. Gardiner, 1902; and R. G. Usher, *A Critical Study of the Historical Method of S. R. Gardiner*, 1916.

Gardiner, Stephen (c. 1493-1555), bishop, b. Bury St Edmunds, and educ. at Trinity Hall, Cambridge, of which he became master in 1525. He was sent by Henry VIII to try to secure the pope's consent to the divorce of Catherine of Aragon, and later he conducted the case against the

queen. He then became successively archdeacon of Norwich, archdeacon of Leicester, secretary of state, and bishop of Winchester (1531). He was chancellor of Cambridge Univ., 1540-1. From c. 1540 G. had great influence over Henry VIII; during Edward VI's reign he was imprisoned and deprived of his see, but was reinstated by Mary and made lord chancellor. In 1535 he had written a justification of Henry's claim to supremacy over the Eng. Church; in Mary's reign he headed the submission to Rome. There is no doubt that G. was ambitious, but his change of views can also be explained by the intervening events of Edward VI's reign, which probably made G., a religious traditionalist, regret his earlier position. He is remembered for his severity towards Princess Elizabeth; but it is unlikely that he was responsible for the mass persecution of Protestants during Mary's reign. He is buried in Winchester Cathedral. See life by J. A. Muller, 1926; and F. M. Powicke, *The Reformation in England*, 1941.

Gardner, Erle Stanley (1889-), Amer. detective-story writer, b. Malden, Massachusetts. He studied law, was admitted to the Californian Bar, and practised for 22 years. He started writing in 1921, his famous lawyer-detective Perry Mason first appearing in *The Case of the Velvet Claws*, 1932, and after that in many other stories of cases. Another series, beginning with *The D.A. Calls it Murder*, 1937, had District Attorney Douglas Selby as hero. G. was in his time the most popular detective-story writer in the U.S.A. See DETECTIVE STORY.

Gardner, Ernest Arthur (1862-1939), archaeologist, b. London. From 1887 to 1895 he was director of the Brit. School of Archaeology in Athens. Yates prof. of archaeology, Univ. College, London, 1896-1929. He wrote *Ancient Athens*, 1902, *A Companion to Greek Studies*, 1905, *The Inscriptions of Attica*, 1905, *Six Greek Sculptors*, 1910, *Religion and Art in Ancient Greece*, 1910, *The Art of Greece*, 1925, and *Greece and the Aegean*, 1933.

Gardner, tn in Worcester co., Massachusetts, U.S.A., 24 m. NW. by N. of Worcester city. There are manufs. of toys, baby carriages, silver goods, heaters and stoves, and foundry and machine-shop products, and it possesses the largest chair factory in the world. Pop. 19,600.

Gare-fowl, or **Great Auk** (Icelandic *Geirfugl*, Gaelic *Gearbhuil*), large sea-bird of the family Alcidae, the *Alca immutabilis* of Linnaeus, similar in appearance to the razor-bill (*Alca torda*). It inhabited the N. hemisphere (temperate region of the N. Atlantic), and has been extinct since 1844, 'owing to the ruthless trade in its eggs and skin.' The G.s had wings so small that it was impossible for them to fly, but they were good swimmers. The chief breeding places were skerries off the coast of Iceland, Funk Is. off Newfoundland, and Spitzbergen. See S. Grievé, *The Great Auk*, 1885; J. Milne, 'Relics of the Great Auk,' in the *Field*, 1875; and J. Fisher, *Bird Recognition*, vol. 1, 1947.

Gareloch, inlet of the Clyde, situated in SW. Dunbartonshire, Scotland. It is about 7 m. in length, and has an average width of a m. It is now mainly used by the Admiralty. The vil. of Garelochhead is a holiday resort.

Garfield, James Abram (1831-81), 20th president of the U.S.A., b. Orange, Ohio, and forced, owing to the death of his father, to earn his own living at a very early age. However, he did not neglect his education, and went to Hiram College, Ohio, and from there to Williams College, Massachusetts. He graduated at the latter place and then went back as a prof. to his old college. Of this he ultimately became president, and he still continued to study law and to practise. On the outbreak of the Civil war he was appointed to command a volunteer regiment, and by his gallantry and ability quickly raised himself, until he was appointed a major-general. In 1863 he resigned his command and entered Congress, where he was quickly recognised as one of the leaders of the Republican party. He retained his seat in Congress until 1880, when he was put forward as the Republican candidate for the presidency. He was elected and took up office in Mar. 1881. He identified himself with the movement for the reform of the civil service and alienated in this way many of his supporters. In July of the same year he was shot by a disappointed fanatic who had unsuccessfully sought office, and d. in Sept. His speeches were collected into 2 vols. in 1882-3. See W. M. Thayer, *From Log Cabin to White House*, 1881; and T. C. Smith, *Life and Letters of James A. Garfield*, 1925.

Garfield, city of New Jersey, U.S.A., in the co. of Bergen, on Passaic R. There are woollen mills and chemical works, also manufs. of clothing, paper, rubber goods, pharmaceuticals, and essential oils. Pop. 27,500.

Garfield Heights, city in Ohio, U.S.A., a residential suburb SE. of Cleveland. Pop. 21,700.

Garfsh, Garpike, see BONY PIKE.

Gargano, peninsula in the E. of Italy, in the prov. of Foggia (q.v.). It extends into the Adriatic Sea for about 31 m., and is from 15 m. to 30 m. in breadth. Monte Calvo is a summit which rises to a height of 5295 ft and is composed chiefly of limestone. The head of the peninsula is Testa de G.

Gargantua, see RABELAIS.

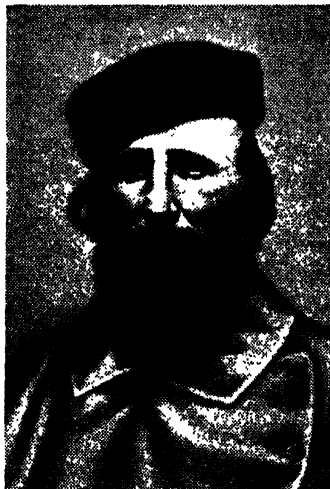
Gargoyle (from Fr. *gargouille*, a throat), projecting lead or stone spout on a building, often designed in the shape of a grotesque monster, to carry the water from a gutter clear of the walls. Among famous G.s are those on the cathedral of Notre Dame, Paris.

Garhmukhtesar, tn. of India, in the United Provs. It is situated on the r. b. of the Ganges in the dist. of Meerut. The inhab. are Hindus, with about 25 per cent Muslims. It is annually the scene of a very large 'mela' or fair, attended by vast numbers of pilgrims.

Garhwal, area of Uttar Pradesh, India. It is somewhat remote and hilly and is

best known in Britain because of the fine G. soldiers recruited there. The former adjoining state of Tehri-Garhwal has been absorbed into the Uttar Pradesh state administration.

Garibaldi, Giuseppe (1807-82), It. patriot, liberator, and guerrilla leader, b. Nice. A fisherman's son, he went to sea, commanding a brig by 1830. About this time (c. 1833) he became acquainted with Mazzini and the leaders of Young Italy, and became an enthusiastic republican nationalist. For his share in the outbreak at Genoa (1834) he had to flee to France. He then sailed to South



GIUSEPPE GARIBALDI

E.N.A.

America, and there offered his services to the rep. or prov. of Rio Grande do Sul, which was in revolt against the emperor of Brazil. He distinguished himself as a guerrilla warrior and in South America married a beautiful creole, Anita Riveira de Silva, the companion of his early It. campaigns and the mother of his children, Menotti, Ricciotti, and Teresa. In 1842 he offered his help to the Montevideans (1836-48) against the Argentine dictator, Rosas. He gives a full account of his colourful exploits in South America in his autobiography.

Returning to Europe, G. took part in the campaign against the Austrians and Fr., and was the leading spirit in the revolutionary gov. at Rome, 1848-9. But the rebellion failed; his wife d., and in 1850 G. was an exile in the U.S.A. In 1854 he returned and settled in Caprera, near Sardinia. He fought for Sardinia against Austria in 1859 and protested vehemently against the cession of Nice

(his bp.) and Savoy to Napoleon III in 1860. After the peace of Villafranca, secretly supported by Sardinia's request, G. organised an expedition against the Sicilies, in the hope of bringing about the union of Italy. This is perhaps his most famous undertaking. He landed at Marsala with his 'thousand volunteers,' defeating the Neapolitan troops, which far outnumbered his own, at Calatafimi, and thus opened the way to Palermo. G. became dictator of Sicily, and crossing to Italy expelled Francis II from Naples and entered the city in triumph. When Victor Emmanuel, king of Italy, appeared with his Sardinian troops in the kingdom of Naples, G. delivered up to him his army and absolute sway over the Neapolitan provs., retiring to Caprera in 1860. This was the moment of his greatest statesmanship; subsequently his career was to be marred by impetuosity; and he imagined himself slighted by the forces he had helped to create. He was severely wounded at Aspromonte (1862), fighting against the royal troops, after his lone attempt to take Rome from the pope, and taken prisoner, but pardoned shortly afterwards. On his second attempt to oppose the papal power (1867) he was utterly defeated by the papal and Fr. troops at Mentana, but was allowed to return to Caprera. In 1870-1 he attempted to help the Fr. Rep. against the Germans, commanding the Fr. volunteers in Burgundy. He entered the It. Parliament in 1874, finally consenting to accept an ann. pension from it. See memoirs (trans. by A. Werner in 1889 as *Autobiography of G. Garibaldi*); A. Mario, *Garibaldi e i suoi Tempi*, 1884; J. Marriott, *The Makers of Modern Italy*, 1889; G. M. Trevelyan, *Garibaldi's Defence of the Roman Republic*, 1907; *Garibaldi and the Thousand*, 1909; and *Garibaldi and the Making of Italy*, 1911; and P. Frischauer, *Garibaldi: Der Mann und die Nation*, 1934.

Gariep, see ORANGE RIVER.

Garigliano (anct *Liris*), riv. of Italy, in SE. Lazio (q.v.). It rises in the Apennines SW. of Subiaco (q.v.) and flows SE. and then S. to the Gulf of Gaeta (q.v.). In its upper courses it is called the *Liri*. The Eighth and Fifth Brit. and Amer. Armies in their offensive against the Gustav line, crossed the G. on 12 May 1944. (See ITALIAN FRONT, SECOND WORLD WAR CAMPAIGNS ON.) Length 75 m.

Garland, Hamlin (1860-1940), Amer. author, b. W. Salem, Wisconsin. He worked on mid-W. farms, then was a teacher for a time. In his realistic novels and short stories he took as his themes the lives of the people on the prairie farms, which he depicts as a narrow and monotonous fight for existence. He was awarded the Roosevelt Memorial Association gold medal for literature, 1930. Among his many vols. some of the best are *Main Travelled Roads*, 1890, *Prairie Folks*, 1892, *The Book of the American Indian*, 1923, *The Trail-makers*, 1926, *Roadside Meetings*, 1930, *My Friendly*

Contemporaries, 1932, *Forty Years of Psychic Research*, 1936, and *The Mystery of the Buried Crosses*, 1938. *A Son of the Middle Border*, 1917, is partly autobiographical, and its sequel, *A Daughter of the Middle Border*, 1921, was awarded the Pulitzer prize.

Garlic, or *Allium sativum*, liliaceous plant which grows wild in S. Europe, especially in Sicily. It is a hardy perennial with bulbous roots, which are much used in cookery and occasionally in medicine.



GARLIC

B, bulb

Garlic Mustard, see ALLIARIA.

Garlic Pear, see CRATAEVA.

Garment Design, see DRESSMAKING.

Garnet, Henry (1555-1606), Eng. Jesuit priest. He was educ. at Winchester, studied law, became a Rom. Catholic, went to Italy, where he joined the Society of Jesus and acquired a reputation for scholarship, then returned as prov. of the Jesuits in England. He was tried on suspicion of being implicated in the Gunpowder Plot and found guilty, possibly on insufficient evidence; but his zeal in furthering schemes in connection with his order no doubt weighed against him, and he was hanged.

Garnet, name of a group of closely related minerals, which crystallise in the cubic system, usually in rhombic dodecahedra or in icositetrahedra, with imperfect cleavage. The chemical composition and hardness vary. G.s. are a good example of an 'isomorphous' group. They are found in crystalline schists, gneiss, metamorphic limestones, granite, serpentine, and sometimes in volcanic rocks and veins. Their usual colour is red, but they occur in almost any colour but blue. (Hardness 7, sp. gr. 3.4-4.3.) Of the semi-precious stones used in jewellery, some of the best known are the pyrope or anct 'carbuncle' (red) from

Saxony and Bohemia, the almandine (bluish-red) from Ceylon, Burma, Brazil, and Scotland, and the uvarovite (green) from the Ural Mts (Siberia) and Canada. Fine red specimens somewhat resemble rubies in appearance, but common G.s have many flaws. Besides being cut as gems, G.s are used for abrasive and other purposes, G.-paper being a substitute for sand-paper, especially in America.

Garnett, David (1892-), novelist, b. Brighton, Sussex, the son of the author, Edward G. (1868-1937), and Constance G., who is celebrated for her trans. from Russian literature. His grandfather was Richard G. (q.v.). G. was privately educ., and then went to the Royal College of Science, where he studied botany. During the First World War he worked with the 'Friends' War Victims' Relief. In 1922 his first novel was pub., *Lady into Fox*, a story with an original theme which made his reputation. It was awarded the Hawthornden prize and the James Tait Black Memorial prize. Two years later he followed up his success with *A Man in the Zoo*. *The Sailor's Return* appeared in 1925, *Go She Must!* in 1927, *The Old Dovecot* and *other Stories* in 1928, and *No Love* in 1929. His themes, blending fantasy and reality, are treated with humour and imagination, for which he employed a clear and simple style. Having learnt to fly (see *A Rabbit in the Air*, 1932), he served with the R.A.F. during the Second World War. His *War in the Air* was pub. in 1941. Other books include *The Grasshoppers Come*, 1931, *A Terrible Day*, 1932, *Pocahontas: or, The Nonpareil of Virginia*, 1933, *Beamy-Eye*, 1935, and *Aspects of Love*, 1955. In 1938 he ed. the letters of T. E. Lawrence. *The Golden Echo*, 1953, and *The Flowers of the Forest*, 1955, are autobiographical.

Garnett, Richard (1835-1906), man of letters and librarian, son of Rev. Richard G., the philologist and one-time assistant keeper of printed books at the Brit. Museum. He was b. at Lichfield, Staffordshire, and in 1851 was appointed assistant in the reading-room of the Brit. Museum, becoming its superintendent in 1875. From 1881 to 1890 he had charge of the preparation of the great catalogue of authors, resigning his post of superintendent in 1884 in order to give all his time to this exacting labour. He was keeper of the printed books from 1890 to 1899, when he retired to devote himself to writing. Among his works are *History of Italian Literature*, 1897, *An Illustrated Record of English Literature* (with Sir Edmund Gosse), 1903-4, and his lives of Carlyle, 1887, Emerson, 1888, Milton, 1890, and Dryden, 1895, contributed to the Great Writer series. His most important pub. are *The Twilight of the Gods and other Tales*, 1888, and *Relics of Shelley*, 1892, a small collection of unpub. verse found by G. He contributed many articles to the *Encyclopaedia Britannica*.

Garnier, Marie Joseph François (1839-1873), Fr. officer and explorer, b. St Etienne. In Cochinchina he served under Adm. Charner. He was the leading spirit

in the journey of exploration which was undertaken nominally under the superintendence of a superior Fr. officer but really under the direction of G., who was responsible for nearly all the observations made in a country which had previously been practically unknown to Europeans. The journey was undertaken from Kratie to Shanghai. In 1873 he undertook the founding of a Fr. protectorate in Tonking. He captured the cap., but was slain in subsequent fighting.

Garnier, Robert (c. 1545-90), Fr. dramatist and poet, b. La Ferté-Bernard. He became a law student, and whilst studying law wrote his first poem, which gained him a prize in the *jeux floraux* at Toulouse, 1565. He was held to be a great orator and was, even in his own generation, recognised as a tragedian of more than ordinary merit. He wrote mainly tragedies on classical subjects, which anticipate Corneille: *Porcie*, 1568, *Hippolyte*, 1573, *Antigone*, 1580, a tragicomedy *Bradamante*, 1582, and *Les Juives*, 1583, based on the Bible. See E. Faguet, *La tragédie française au 16^e siècle*, 1883; R. Lebegue, *La tragédie française de la Renaissance*, 1944.

Garnierite, nickel-containing mineral occurring in New Caledonia. G. is double silicate of nickel and magnesium, containing 24 per cent of the former metal. Its formula is $(\text{Ni}, \text{Mg})\text{SiO}_3 \cdot x\text{H}_2\text{O}$. It is worked upon a large scale in France for the preparation of nickel.

Garnish Island, see GLENGARRIFF.

Garnishee, person in whose hands money or property belonging to a debtor or defendant has been attached at the suit of a creditor or plaintiff, and who has had warning or notice of such attachment (q.v.). A G., after receipt of such notice, must not part with the debtor's money or property except to answer the creditor's claim or until the attachment is dissolved. But there can be no execution against a G. in respect of such property unless there has been a judgment entered against the prin. debtor, and, further, a G. is entitled as against the creditor or plaintiff to set up the rights of third parties to whom he himself is under some liability in respect of the property.

Garo Hills, mountainous dist. of India, situated southward of the Brahmaputra, in W. Assam. The mts rise to a height of 4650 ft above sea level, and have the appearance of parallel ridges, with deep valleys between. The dist. covers an area of 3270 sq. m., and the inhab. the Garos, are a strong and energetic race, darkish brown in colour. The exports are cotton and forest products. Large quantities of coal and petroleum are to be found in the hills. The administrative H.Q. are at Tura. Pop. about 200,000.

Garofalo, or Benvenuto Tisio (1481-1559), It. painter, last representative of the Ferrara school, and follower of Raphael. In the church of San Niccolò at Ferrara he painted in 1500 the 'Virgin Mary and Infant Jesus,' in the church of Santa Maria de' Servi the 'Nativity,' and in San Lorenzo the 'Adoration of the

Magl. There are sev. examples of his eclectic style in the National Gallery.

Garonne, riv. of France, which rises in the vale of Aran, on the Sp. side of the Pyrenees. Its course is generally NW. Flowing through France, it passes the depts of Haute-Garonne, Tarn-et-Garonne Lot-et-Garonne, and Gironde. Its tribs. are the Save, Gers, Tarn, Lot, and Dordogne. Below Bordeaux it widens into the great Gironde (q.v.) estuary and enters the Atlantic. At Toulouse the Canal du Midi links it with the Mediterranean. Length 350 m.

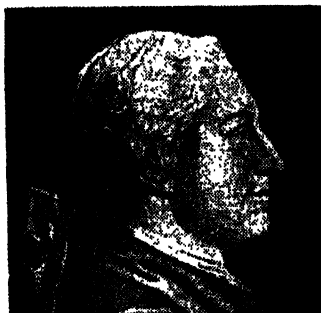
Garonne, Haute-, dept of S. France formed of parts of the anct provs. of Languedoc and Gascony. The S. is mountainous, containing some of the highest peaks of the Pyrenees, including Mt Perduère (10,560 ft). The intervening valleys are very fertile. The centre of the dept is a hilly plateau. The chief riv. is the G., and the Canal du Midi and the Canal latéral à la G. cross the N. of the dept. Vines, cereals, fruit, and potatoes are cultivated, and livestock is raised. There are chemical, metallurgical, paper, foodstuff, engineering, leather, and hydro-electric industries. The prin. tns are Toulouse (the cap.), Muret, and St-Gaudens (qq.v.). Area 2457 sq. m. Pop. 525,700.

Garpiké, see BONY PIKE.

Garrett, João Baptista de Almeida-, see ALMEIDA-GARRETT.

Garrick, David (1717-79), actor and playwright, b. Hereford, descended on his father's side from Huguenot refugees called De la Garrique. He was educ. at Lichfield Grammar School and partly under Dr Johnson, with whom he came to London about 1737. He studied at Lincoln's Inn, and set up in the wine trade with his brother for a time, but soon gave up both for the stage. His first public appearance was at Ipswich in 1741, in *Oroonoko*. Later in the year he appeared in his famous role of Richard III. He went over to Dublin twice, becoming joint manager with Sheridan in 1745, and roused much enthusiasm there. Don Felix, in *The Wonder*, was one of G.'s favourite parts, first played in 1756, and also at his last performance, 1776. In 1747 G. and Lacy were joint managers of Drury Lane Theatre, and G. continued in this office till his retirement (1776). In 1749 he married the Viennese danseuse, Mlle Violette. Quarrels among members of his company led to the famous rivalry between Drury Lane and Covent Garden, sev. of his performers joining the opposition house. In 1750 *Romeo and Juliet* was acted by G. and Mrs Bellamy at Drury Lane, and by Spranger Barry and Mrs Cibber at Covent Garden. Drury Lane, however, triumphed in the end. In 1769 G. conducted a notable jubilee in Shakespeare's honour at Stratford-on-Avon. He did much to restore the original form of that great dramatist's plays and do away with the altered versions then in common use. With him ended the old custom of admitting spectators on the stage itself, and he introduced

various other reforms, including more suitable costumes for the actors, dressing players more or less in the period of the plays presented and also according to the country in which the play was set. He had costumes made, and every one bore a tab stating 'The Property of the Management.' This was the origin of the word 'properties,' in the sense of things used on the stage. With Goldsmith, Johnson, Burke, and others G. was a member of the Literary Club. Among his comedies and farces are *The Lying Valet*, 1741, *Lethe*, 1745, *High Life below Stairs*, 1759, and *The Clandestine Marriage*, 1766. Selections of his dramatic works were brought out in 1768 and 1798. One of Sir Charles Wyndham's great parts was that of D. G. in the play of that name (adapted from the Fr. Sullivan by Robertson), the last



DAVID GARRICK

revival being at his theatre in 1900. See T. Davies, *Memoirs*, 1780; J. Boaden (ed.), *The Private Correspondence of D. Garrick*, 1831-2; F. Hedgcock, *A Cosmopolitan Actor: David Garrick and his French Friends*, 1912; C. R. Williams, *David Garrick, Actor-Manager*, 1929; E. P. Stein, *David Garrick, Dramatist*, 1938; and lives by P. Fitzgerald, 1868; J. Knight, 1894; A. Murphy, 1901; C. Gaehde, 1904; D. MacMillan, 1934; and Margaret Barton, 1948.

Garrick Club, social and dramatic club named after the famous actor and dramatist David G. (q.v.). It was founded in 1831, its avowed objects being 'the general patronage of the drama, and the formation of a theatrical library, with works on costumes, making-up, etc.' The entrance fee is 35 guineas, and the ann. subscription is 25 guineas. The club possesses a collection of more than 600 theatrical portraits and other pictures, and numerous theatrical relics. It is situated at 15 Garrick Street, W.C.2. See also CLUBS. See G. Boas, *The Garrick Club*, 1948.

Garrick Theatre, Charing Cross Road, London, built by W. S. Gilbert, first opened by Sir John Hare in April 1889 with Pinero's *The Profligate*. It must be

distinguished from the G. T. opened in Whitechapel in 1830, which was rebuilt in 1845 and used for *opéra bouffe* as late as 1879. Some of the more important plays produced at the present theatre were Grundy's *A Pair of Spectacles*, 1890, Pinero's *Lady Bountiful* and Robertson's *School*, 1891, and Grundy's *A Fool's Paradise*, 1892. Pinero's *The Notorious Mrs. Ebbesmith* was produced in 1895, in which year Mme Réjane appeared here in *Mme Sans-Gêne* and *Ma Cousine*. Later successful productions were *Cyrano de Bergerac*, with Robert Loraine in the name part, 1910, Eden Phillpotts's *The Runaways*, 1928, *The Lady with a Lamp*, Jan. 1929, *The Stranger Within*, June 1929, *Happy Families*, Oct. 1929, *My Wife's Family*, 1931, *One Wild Out*, 1948, *The Gay Invalid*, 1951, and *La Plume de Ma Tante*, 1955.

Garrison, William Lloyd (1804-79). Amer. philanthropist, leader of the abolitionists in the anti-slavery struggle. In 1826 he became editor of the Newburyport *Free Press*. He ed. the *National Philanthropist*, 1827, and pub. at Boston the celebrated *Liberator*, a jour. urging the abolition of slavery in the S., from 1831 to 1865. He was much influenced by Lundy, and joined him at Baltimore, 1829, in editing the *Genius of Universal Emancipation*. His vigorous denunciation of slavery involved him in a charge of libel, and brought about his imprisonment at Boston in 1831. In 1832 he founded the New England Anti-Slavery Society, the first of many similar organisations. The Amer. Anti-Slavery Society was formed in 1833 in Philadelphia. Of this G. was president 1843-65. His extreme views made him many enemies, and his life was often threatened, but he lived to see his hopes in great part realised. He pub. *Thoughts on African Colonisation*, 1832, and *Sonnets and Other Poems*, 1843. *The Words of Garrison* appeared in 1905. See also ABOLITIONISTS. See William Lloyd Garrison, the Story of His Life, by his children, 1885-9; F. E. Cooke, *An American Hero: the Story of W. L. Garrison*, 1910; and J. J. Chapman, *Garrison*, 1913.

Garrod, Heathcote William (1878-), scholar, b. Wells, Somerset. Educ. at Oxford, where he won the Newdigate prize for Eng. verse, he became a fellow of Merton in 1901. During the First World War he was at the Ministry of Munitions, and in 1918 was awarded the C.B.E. From 1923 to 1928 he was prof. of poetry at Oxford, and in 1929 Norton prof. at Harvard, his lectures being pub. as *Poetry and the Criticism of Life*, 1931. He ed. the *Oxford Book of Latin Verse*, 1912, and the poems of Keats, 1939. Others of his works are *The Profession of Poetry*, 1929, *Poetry and Life*, 1930, *The Study of Poetry*, 1936, *Scholarship: its Meaning and Value*, 1946, and studies of Byron, 1923, and Keats, 1926.

Garron, see HORSE, Pontes.

Garrotte (Sp. 'cudgel') is an appliance which is used in Spain for the execution of criminals. The condemned man is

seated on a scaffold and fastened to an upright post by an iron collar (the G.), and a knob worked by a lever dislocates his spinal column. *Garrotting* is the name given in England to a form of robbery which became rather common in 1862-3. The Act of 1863, which imposed flogging for this offence, is generally accepted as having put a stop to it, though humanitarians contend that the outbreak of garrotting was already coming to an end. See also CAPITAL PUNISHMENT. See H. S. Salt, *The Fallacy of Flogging*, 1916.

Garstang, John (1876-1956), archaeologist. Educ. at Blackburn Grammar School and Jesus College, Oxford. G. was engaged in archaeological research from 1897, notably on Rom. sites in Britain, in Egypt, Nubia, and Asia Minor. After the First World War he was appointed director of the Palestine Gov.'s dept of antiquities, which he was instrumental in founding in 1920. From 1907 to 1941 he was prof. of the methods and practice of archaeology at Liverpool Univ. G. was leader of the Marston archaeological expedition to Jericho, and his discoveries there (1930-1) afforded the strongest evidence of the authenticity of O.T. narratives (see also JERICHO). Head of the Brit. Institute of Archaeology in Ankara, Turkey, 1948. Pubs.: *Roman Ribchester*, 1899, *The Third Egyptian Dynasty*, 1904, *A Short History of Ancient Egypt* (in collaboration with Prof. Percy Edward Newberry), 1904, *The Land of the Hittites*, 1910, *The Foundations of Biblical History: Joshua and Judges*, 1931, *The Heritage of Solomon*, 1934; reports on the excavation of Abydos, Meroë, Jericho, and Mersin in *Liverpool Annals of Archaeology*, 1932-9; *Prehistoric Mersin*, 1953.

Garstin, Sir William Edmund (1849-1925), civil engineer, b. in India, son of a civil servant there. Educ. at Cheltenham and King's College, London. Returning E., he served for 12 years in the Indian public works dept. From 1892 to 1904 he was inspector-general of irrigation in Egypt, being also under-secretary for public works. He explored the Nile from source to delta, a 7000-m. journey, much of it through terrible malaria-ridden country, and presented a brilliant report. His investigations convinced him that, with so vast a loss of Nile water through enormous swamps and evaporation, the water of the lower riv. should be stored in great quantities during the ann. flood, and distributed through irrigation canals when the riv. reached its lower levels. The work of control of the flow of the riv. was carried out mainly under G.'s administration and in accordance with his plans. It comprised the construction of the Aswan dam and the barrages at Asyût and Esna, which were all parts of one system of water storage and control. The subsequent heightening of the dam and the construction of the Esna barrage were not completed before he retired. The Asyût barrage was constructed, according to G.'s directions, from the

original design of (Sir) Wm Willcocks (q.v.) (1898-1902). In addition G. caused the clearing of the White Nile of its floating forests of rotting vegetation (sudd) which made navigation difficult or impossible. Lord Cromer says that it would be difficult to exaggerate the debt of gratitude which the people of Egypt owed to G. (see *Modern Egypt*, vol. 1, p. 686); and on another occasion he described G. as the greatest hydraulic engineer in this or any other country. The Egyptian Nationalist press styled G. 'the treasure of Egypt.' Knighted 1897, and in 1904 he was appointed a director of the Suez Canal Company.

Garston, suburb of Liverpool, Lancs, England, incorporated in the city in 1902, with an extensive dock system operated by the Dock and Inland Waterways Executive. G. imports largely West Indian produce and Scandinavian timber; it has sev. old-estab. industries in addition to those at Speke new township, industrial estate, and airport, which adjoin.

Garter, Order of the, see ORDERS OF KNIGHTHOOD, GREAT BRITAIN AND IRELAND (1).

Garter King-of-Arms, one of the officers of the order of the Garter, the others being the prelate, chancellor, registrar, and gentleman usher of the black rod. He is also *ex officio* senior member of the College of Heralds under the earl marshal.

Garth, Sir Samuel (1661-1719), doctor and poet, b. Balam, Durham. Educ. at Peterhouse, Cambridge, he studied medicine at Leyden, and in 1693 was elected a Fellow of the College of Physicians. A zealous Whig, he was a friend of Addison and Pope, and became physician to George I, who knighted him in 1714. He is chiefly remembered as the author of *The Dispensary*, 1699, a mock-heroic satire on apothecaries, which introduces a scheme for setting up charitable dispensaries where the poor could obtain advice and prescriptions. He also wrote *Claremont*, 1715, and ed. a trans. of Ovid's *Metamorphoses* to which Addison, Pope, and others contributed. He is included in Johnson's *Lines of the Poets*. See also R. Bond, *English Burlesque Poetry*, 1932.

Gartokh, or **Gartok**, tn in Great West Tibet in the Nari-Khorsum (Ali) prov. to the E. of long. 80° E., S. of lat. 32° N. It stands at a height of 14,240 ft above the sea in one of the loftiest mt regions in the world. To the E. of the tn are salt-mines, and the important gold-mining dist. of Thok-Jalung lies 85 m. to the NE. An active trade is carried on in shawl wool, tea, etc. In accordance with the Tibet Treaty of 1904 it was open to Brit. trade. In winter G. contains only a few dozen people, but in summer trade passing through makes it a busy place.

Garvie, Alfred Ernest (1861-1945), religious author; b. Zyrardov, Russian Poland, and educ. privately and at George Watson's College, Edinburgh. He took his M.A. at Oxford in 1892, was minister of Macduff Congregational church, 1893-5, and of Montrose Congregational church, 1895-1903. Prof. of

theology in Hackney and New Colleges, London, 1903-7. Principal of New College, Hampstead, from 1907. His puba. include *The Ethics of Temperance*, 1895, *The Ritschlian Theology*, 1899, *The Gospel for To-day*, 1904, *My Brother's Keeper*, 1905, *The Christian Certainty*, 1910, *The Christian Belief in God*, 1935, *Revelation through History and Experience*, 1934, *The Christian Faith*, 1936, *Memories and Meanings of My Life*, 1937, and *Christian Moral Conduct*, 1938.

Garvin, James Louis (1868-1947), journalist, b. Birkenhead, Cheshire, of Irish parentage. Entering journalism, he was a leader-writer on the *Newcastle Chronicle* from 1891 to 1899, when he joined the staff of the *Daily Telegraph*. In 1905 he ed. the *Outlook*, from 1912 to 1915 the *Pall Mall Gazette*. As editor of the *Observer* from 1908 to 1942 he was one of the best-known and most influential journalists in the country. His works include *The Economics of Empire*, 1905, *Tariff or Budget*, 1909, *The Economic Foundations of Peace*, 1919, and a monumental *Life of Joseph Chamberlain*, 1932. From 1926 to 1929 he was editor-in-chief of the *Encyclopaedia Britannica*. He received honorary doctorates of Edinburgh and Durham and in 1941 was made a Companion of Honour. See life by Katharine Garvin, 1948.

Gary, city in the heart of the Calumet region of Indiana, U.S.A., at S. end of Lake Michigan, 25 m. from the centre of Chicago. Now one of the world's greatest steel-making centres, it was built up, 1905-9, on sand marshes and dunes. It has 700 ac. of parks and is known for its development of the 'platoon' (work-study-play) system. Pop. 133,900.

Gas, **Coal**, see GAS MANUFACTURE.

Gas, **Nascent**, see NASCENT STATE.

Gas, **Noble**, or **Rare**, see INERT.

Gas, **Poison**, see CHEMICAL WARFARE.

Gas and Gases. The word **gas** was invented by J. B. van Helmont (c. 1640) to describe the G. now known as carbon dioxide. It was formerly supposed that the word was derived from the Dutch *geest* (Ger. *Geist*), spirit, but that this is an incorrect view is shown by van Helmont's words: 'I have called this spirit **gas**, as it is not distinguishable from the Chaos of the ancients.' The term is now used to describe one of the 3 states of aggregation of matter. In simple language these 3 states of aggregation may be defined thus: 'A solid has volume and shape; a liquid has volume, but no shape; a gas has neither volume nor shape' (Sir O. Lodge). 'Vapour' is the term applied to a G., which by comparatively small changes of temp. or pressure may be liquefied. The first G. to be studied in detail was atmospheric air. It was probably suspected in the 17th cent. by Rey and Mayow that the increases in weight which a metal undergoes during burning in air is due to a combination of the metal with some constituent of the atmosphere. The recognition of this important fact and of its full significance was greatly retarded by the influence exerted by the phlogistic

school (see phlogistic theory under *History in CHEMISTRY*). The discovery of oxygen by Priestley and Scheele, and of nitrogen by Cavendish, failed to explain what happened during combustion, until these facts were interpreted by Lavoisier, who gave the first satisfactory explanation of the phenomena of combustion, and thereby estab. the principle now known universally as the conservation of mass. The early workers on the nature of G.s (or 'airs' as they were then called) were Cavendish, Black, Scheele, and Priestley, and to their credit must be set the discovery of oxygen, hydrogen, nitrogen, carbon dioxide, oxides of nitrogen, etc., and the investigation of their properties. Towards the end of the 19th cent. sev. 'rare' G.s (q.v.) were identified and isolated by Ramsay, Rayleigh, Travers, and other workers. These G.s are argon (now used in G.-filled lamps), krypton, xenon, neon (familiar in advertising signs), and helium (found first in the sun and subsequently in the atmosphere and on the earth near radioactive springs). The properties of G.s have been studied extensively, and the fruits of these investigations are (a) the atomic theory of matter, (b) the kinetic theory of matter, and (c) the electrical theory of matter. Dalton, Gay-Lussac, and Avogadro are associated with the important discoveries that led to the first theory; Bernoulli, Maxwell, and Clausius with the second theory; while J. J. Thomson and Rutherford are 2 of the most famous scientists associated with the discoveries that estab. the third theory. There are 4 fundamental rules or laws governing the behaviour of G.s, viz.:

1. *Gay-Lussac's Law*.—The vols. of reacting G.s bear a simple relation to each other and to the vol. of the resulting product.

2. *Boyle's Law*.—The vol. of a given mass of G. varies inversely as its pressure, provided that its temp. remains constant. Mathematically this is stated as follows: $PV = a$ constant, where P is the pressure and V is the vol. of the given mass of G. at the given temp.

3. *Charles's Law*.—The vol. of a given mass of G. increases by $\frac{1}{273}$ of its vol. at 0° C. for a rise of 1° C., when the pressure of the G. is kept constant.

4. *Avogadro's Law*.—Equal vols. of all G.s measured under the same conditions of temp. and pressure contain equal numbers of molecules.

The above laws apply only to 'perfect' G.s (see below). They are approximately obeyed at ordinary temps. and pressures by the so-called 'permanent' G.s, e.g. oxygen, air, hydrogen, helium, etc., which are liquefied only at temps. far below 0° C.

Kinetic Theory of Gases (q.v.).—The striking successes of this theory are (1) the explanation of the pressure, vol., and temp. relations of a G. mentioned above, (2) the determination of the sizes, speeds, and 'free paths' of the molecules of G.s, (3) the explanation of the phenomena of viscosity, diffusion, and conduction of heat in G.s, (4) the explanation of the

specific heats of G.s, and (5) the interpretation of the laws of thermodynamics (q.v.). The mathematical calculations underlying this theory begin by postulating a *perfect gas*, viz. a G. whose molecules are comparable to perfectly elastic particles of negligible dimensions that exert no force of attraction on each other. These molecules are in constant motion, and their velocities are changed only when they collide with each other. The molecules travel in straight lines between collisions. Subsequently the properties and behaviour of real G.s are explained, and the following data give an idea of some of the results of this theory: (1) *diameter of molecules*: hydrogen 2.4×10^{-8} cm.; oxygen 3.0×10^{-8} cm.; nitrogen 3.2×10^{-8} cm.; helium 1.9×10^{-8} cm.; (2) *mean velocity at 0° C.* and a pressure of 760 mm. of mercury of molecules hydrogen, 169,400 cm. per sec.; oxygen 47,000 cm. per sec.; nitrogen 50,000 cm. per sec.; helium 132,000 cm. per sec.; (3) at 0° C. and 760 mm. of mercury pressure, the number of molecules in 1 c.c. of a G. is 2.8×10^{19} . Some idea of the state of affairs in a G. may be gathered from the fact that a molecule suffers something like 8,000,000,000 collisions per sec. at normal temp. and pressure. The walls of the containing vessel are bombarded by the molecules of the G. and this bombardment accounts for the phenomenon of the pressure exerted by a G.

Densities and Molecular Weights of Gases.—Since equal vols. of G.s under the same conditions contain equal numbers of molecules, the densities are in the same ratio as the molecular weights. This principle of Avogadro furnishes a method of determining molecular weights of substances in the gaseous condition. If hydrogen be taken as the unit in determining densities, then since the molecular weight of hydrogen is 2, the molecular weights of G.s are twice the respective densities. In order to determine the density of a G. 2 methods are available: (1) by weighing a known vol. of the G., (2) by measuring the vol. of a known mass of G.

In order to determine the density of a vapour, Victor Meyer's method is used. It consists essentially in volatilising a small known mass of the substance, and collecting and measuring its vol. by the vol. of air it displaces from the apparatus. Vapour densities are of importance in determining the molecular complexity of substances. Hydrogen, chlorine, and nitrogen, for example, are shown to be diatomic, i.e. to contain 2 atoms in the molecule. Zinc, cadmium, and mercury, on the other hand, are monatomic. It is interesting to notice that in many cases the number of atoms in the molecule varies with the temp. In the case of sulphur, for example, the vapour density at 500° C. shows that there are 8 atoms in the molecule, whilst at 1100° C. there are only 2 atoms in the molecule.

Specific Heats of Gases (see *SPECIFIC HEAT*).—The first law of thermodynamics

(q.v.) states that work (q.v.) may be performed at the expense of heat energy, and that the amount of work so performed is equivalent to the amount of heat energy supplied to do this work. When a G. is heated it may expand and do work; in this case only part of the heat supplied will be available for raising the temp. of the G. As the G. may be allowed to expand in an infinite variety of ways, it follows that when a given amount of heat is supplied to a given mass of a G. its rise of temp. may be one of an infinite variety of values. In other words, a G. has an infinite number of specific heats. Two of these are of considerable importance, viz. the specific heat of a G. at constant vol. (C_v) and the specific heat of a G. at constant pressure (C_p). For hydrogen $C_p = 3.41$; $C_v = 2.40$. For monatomic G.s the kinetic theory of G.s gives $C_p/C_v = \frac{5}{2}$; for diatomic G.s $C_p/C_v = \frac{7}{2}$; for triatomic G.s $C_p/C_v = \frac{9}{2}$. Although these theoretical deductions are made for perfect G.s, the success of the theory may be gauged from the following typical results for this ratio for G.s that approximate to a perfect G. under ordinary conditions: argon (monatomic) 1.667; hydrogen (diatomic) 1.407; nitrous oxide (triatomic) 1.324.

Diffusion of Gases (see DIFFUSION).—Diffusion takes place more readily in G.s than in solids or liquids, by reason of the greater velocities of the molecules in the gaseous state, and because the force of attraction between the molecules of a G. is exceedingly small. Graham's researches on the diffusion of G.s led to the conclusion that the rate of diffusion is inversely proportional to the square-root of the density of the G. Hydrogen, being the lightest G., will diffuse most quickly, but when any G.s are mixed together diffusion results in a uniform mixture of the G.s.

Liquefaction of Gases.—When a G. contained in a vessel is subjected to a continually increasing pressure, the vol. may continually decrease, the contents remaining homogeneous, or a separation into G. and liquid may result. The deciding factor is the temp. It has been found that for every G. there is a temp., known as the *critical temperature* (q.v.) above which it is impossible to liquefy the G. however much it is compressed. The behaviour of G.s during compression is well illustrated by the case of carbon dioxide, which was studied exhaustively by Andrews. He found that the critical temp. for carbon dioxide is 30.92°C . The pressure required to cause liquefaction at this temp. is called the *critical pressure*. Although the problem of the liquefaction of G.s received early attention and the possibility of the liquefaction of air was vaguely hinted at by Lavoisier, the cause of the 'resistance' offered by the so-called permanent G.s was not understood until the above critical phenomena had been examined. The early experimenters included Mouton and Clouet, who liquefied sulphur dioxide, Davy and Faraday, who liquefied chlorine, and Bussy, who in 1824 showed that when liquid sulphur dioxide

was allowed to evaporate a much lower temp. was obtained. This observation has been of prime importance in later work on the liquefaction of G.s, for it has enabled experimenters to cool the 'recalcitrant' G.s below their critical temps. when liquefaction can be obtained by compressing the G.s sufficiently. Cailliet in 1877 liquefied oxygen and carbon monoxide by subjecting the G. to a pressure of 300 atmospheres, cooling it by evaporating sulphur dioxide, and then suddenly releasing the pressure. Pictet also succeeded in liquefying oxygen, and thought he obtained evidence of having prepared liquid hydrogen. Wroblewski and Olszewski in 1883 liquefied oxygen, previously cooled by liquid ethylene at -130°C ., and then liquefied hydrogen previously cooled by liquid oxygen. Many of the so-called permanent G.s were also solidified. More recent work is that of Linde, Hampson, Dewar, and Kammerlingh Onnes. The same principle was adopted by each worker, viz. the G. is compressed and then cooled. After cooling it is allowed to expand by passing through a porous plug (Joule-Thomson effect), whereby the temp. is further reduced. The cold G. is used to cool more of the compressed G., and the process of cooling continues until finally liquid is formed. The last G. to be liquefied was helium (Kammerlingh Onnes, 1908). It is interesting to note that this G. and other rare G.s were isolated by the fractional distillation of liquid air. The following are the boiling-points of some of the so-called permanent G.s under a pressure of 760 mm. of mercury: hydrogen -252.7°C ., oxygen -183.0°C ., nitrogen -195.8°C ., argon -185.7°C ., helium -269°C . Liquid G.s are stored in *Dewar glasses* ('vacuum flasks'), which are double-walled, the space between the walls being evacuated in order to minimise conduction and convection of heat to the liquid, and the inner surfaces of the walls are silvered in order to prevent radiation to and from the liquid G.

Van der Waals's Equation.—The 'characteristic' equation for a perfect G. obtained by combining the laws of Boyle and Charles, is $PV = RT$; P = pressure, V = volume, R = a constant, and T = absolute temp. of the G. The value of R depends on the mass of G. under consideration; for a mass of G. equal to the molecular weight in grams it has the value 8.3×10^7 , where the vol. of the G. is measured in c.c., and its pressure in dynes per sq. cm. T is measured from the absolute zero of temp., viz. -273°C ., the lowest possible temp. Real G.s—even the so-called permanent G.s—obey this equation only approximately at ordinary temps. and pressures, whilst at temps. not far above their critical temps., or at high pressures, the deviations from the behaviour of a perfect G. are serious. This is due to 2 causes: (1) The molecules of a real G. are of finite size, (2) the attraction exerted by the molecules on each other is not zero. The importance of these 2 factors is relatively small when

the pressure of the G. is small and the temp. is considerably above its critical temp., for then the vol. occupied by the incompressible material (the molecules themselves) is very small compared with the vol. occupied by the G., and the distance between the molecules is relatively great. A vapour is defined as a G. at a temp. below its critical temp., and its properties differ considerably from those of the perfect G. Van der Waals's equation is an attempt to obtain a characteristic equation for a real G.—an equation that will be true for all temps. and pressures, so that it does not differentiate between a G., a vapour, and a liquid, but attempts to account for the observed differences in their properties. This

equation is $(P + \frac{a}{V^2})(V - b) = RT$, a and

b being constants for the G. We can compare this equation with that of the perfect G., viz. $PV = RT$, and interpret

the term $\frac{a}{V^2}$ as representing the effect on

the pressure of the molecular attraction resisting the expansion of the G. The constant b is about 4 times the total vol. of the molecules. These terms are relatively unimportant at ordinary temps. and pressures for G.s like air, hydrogen, etc., and hence these G.s approximate to perfect G.s under such conditions. Qualitatively van der Waals's equation has been successful in accounting for the deviations from the perfect G. laws, and for the existence of a critical temp. Its quantitative success is fairly good for carbon dioxide, but its success for other G.s is not striking. Following van der Waals many attempts have been made to obtain a characteristic equation for a fluid, and of these the equations proposed by Clausius, Chappuis, Dieterici, and Lees are the most noteworthy.

See PHYSICAL CONSTANTS.

See also E. H. Kennard, *Kinetic Theory of Gases*, 1938; Sir J. Jeans, *Introduction to the Kinetic Theory of Gases*, 1940; J. R. Partington, *General and Inorganic Chemistry*, 1946; Sir J. Townsend, *Electrons in Gases*, 1948; T. G. Cowling, *Molecules in Motion*, 1950; S. Chapman and T. G. Cowling, *Mathematical Theory of Non-uniform Gases*, 1952.

Gas Cookers. Among the earliest attempts to use gas for cooking were those of J. Sharp about 1835, when he constructed ovens heated by gas for baking. In one that he constructed for a Leamington hotel a dinner was prepared for a hundred persons.

The modern gas cooker is a very efficient and well-designed appliance, consisting of an oven and a hot-plate, with boiling and simmering burners and a grill. In some G. C. the grill is fitted above the hot-plate at eye-level. The hot-plate can be placed either above the oven or alongside it. Cookers can be free-standing or built into cupboard fittings. Thermostatic control of the oven gives precise reproducible cooking conditions and eases the cook's

tasks. A low-temp. cabinet for keeping food and plates warm or for long-period slow cooking can be an integral part of the cooker or fitted independently of it. G. C. are finished in easily cleaned enamel with safety taps of chromium or plastic material, and ovens are well insulated to prevent heat loss. From 8,000,000 to 9,000,000 homes in Great Britain use gas for cooking.

Gas Discharge, luminous electric discharge (q.v.) in certain gases or vapours, neon, sodium, mercury vapour; used in electric lamps (q.v.).

Gas Engines are internal-combustion engines (q.v.) using a gaseous fuel. The first real gas engine was built in 1820 by Wm Cecil of Cambridge, who used the explosion of a mixture of hydrogen and air in the cylinder to drive the piston. This engine did not achieve commercial importance, but it is interesting to note that during 1939-45 the Germans used hydrogen peroxide as working substance

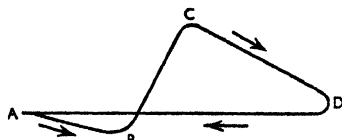


FIG. 1. LENOIR CYCLE

in submarine engines. The first practically important gas engine was made by Lenoir in 1860. In construction this resembled an ordinary single-cylinder horizontal steam engine. Slide valves worked by eccentrics controlled the admission of air and gas and the escape of the combustion products to the air. As the piston moved forward it drew in an explosive mixture of air and gas, and at mid-stroke the inlet valve closed and the mixture was ignited by an electric spark. During the remainder of the stroke, work was done because of the rapid rise of pressure of the hot products, and simultaneously the products of a previous explosion on the other side of the piston were expelled. In the course of the backstroke the products formed by the explosion described were expelled, and a fresh explosive mixture drawn in on the other side, and so on. An indicator diagram from Lenoir's engine is shown in Fig. 1. The action takes place in the direction shown by the arrows.

The curve AB represents the gas and air being drawn in at an almost uniform pressure. Then there is a rapid rise of pressure as the mixture explodes, shown by BC; after which, while the products continue to expand, the pressure gradually diminishes, as shown by the curve CD. Finally the backstroke expels the products at atmospheric pressure as represented by the horizontal line DA. On account of its excessive consumption of gas—nearly 100 cu. ft per h.p. per hr (about 5 times

the quantity used in a modern gas engine), due to the small expansion of the explosive mixture, and the low pressure on the piston—the engine was soon superseded, though a number of Lenoir engines were actually:

a vertical engine with a cylinder open at the top, in which a heavy piston was forced up by explosion of a gas-air mixture at the bottom, and did work on descending by its own weight. This engine was not a success, but 10 years later Otto made the first practical use of a cycle of operations suggested by Barnett

stroke. Then as the piston moves back over the exhaust stroke, and gradually sweeps the chamber clear, the pressure falls back to the atmospheric level, as shown by F.A.

The irregularity of motion arising from the fact that only one stroke in 4 is a power stroke may be partly overcome by using a large flywheel, or 2 or more cylinders may be used on the same crankshaft, and their action so timed that uniformly distributed impulses are given to the shaft, but in any case an engine working on the 4-stroke cycle will have greater weight per h.p. developed than

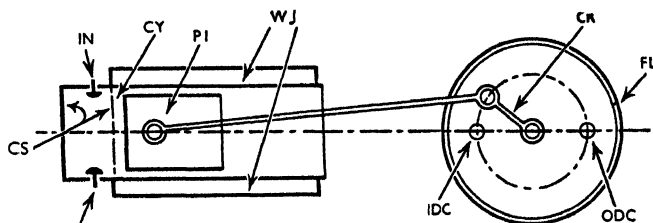


FIG. 2. DIAGRAM OF OTTO ENGINE

IN, inlet; CY, cylinder; PI, piston; WJ, water jacket; CR, crank; FL, fly-wheel; CS, combustion or clearance space; EX, exhaust; IDC, inner dead centre; ODC, outer dead centre

in 1838 and worked out by Beau de Rochas in 1862.

Fig. 3 shows the Otto cycle diagram. AB represents the first or charging stroke of the cycle, when the mixture is being taken in at what is practically atmospheric pressure. BC corresponds to the compression stroke. Ignition takes place at C, and the pressure rapidly rises as shown

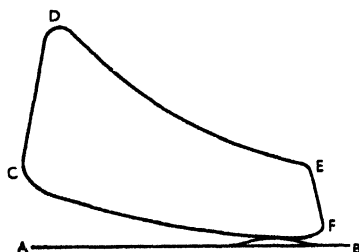


FIG. 3. OTTO CYCLE

by the steep curve to D. DEF indicates the working stroke. From D to E indicates the ordinary expansion and consequent gradual fall of pressure. Towards the end of this stroke the exhaust valve opens, allowing the waste gases to escape, with the resultant sudden decrease in pressure, as shown by EF. So CDEF represents the full effect of the working

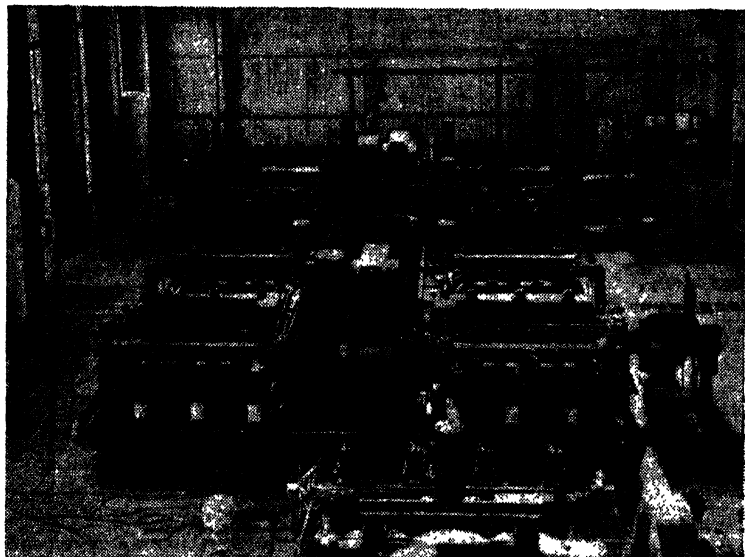
one working on a 2-stroke cycle. A 2-stroke gas engine was invented in 1880 by Dugald Clark. Gas and air were mixed and slightly compressed in a separate cylinder (the 'displacer') and discharged into the working cylinder at the end of the power stroke, as the piston overran and uncovered the exhaust portholes in the cylinder wall. Owing to the compression of the charge in the displacer the charge sweeps out the burnt gases. On the return stroke the piston covers up the exhaust ports, and the charge is compressed, ignition occurs at inner dead centre, the expansion drives the piston forward, and as soon as the exhaust ports are uncovered the new charge is drawn in. Against the advantage of the engine producing one power stroke in every 2 must be set the addition of the displacer cylinder, but this may be of comparatively light construction, as it deals with the charge at ordinary temp. and low pressure, just sufficient to sweep the combustion products out of the working cylinder. The fact that some of the incoming gases may be mixed with the exhaust and lost, is of minor importance when waste gases are used, as these are produced in large quantities at low cost. All modern G. E. work on either the 4-stroke or the 2-stroke cycle, and, in addition may be single-acting or double-acting. In the latter combustion takes place on either side of the piston alternatively.

The temp. developed at the explosion in G. E. may reach 2000° C., and exceeds the melting-point of the iron used in the

cylinder and piston. It is therefore necessary to enclose the cylinder in a jacket in which cooling water is circulated. But as heat is thereby extracted from the working substance the efficiency is appreciably reduced. Moreover steep temp. gradients are set up in the wall, from the explosion temp. to that of the cooling water, and, further, the cylinder wall is alternately heated (at explosion) and cooled (at expansion), and this temp.

suction stroke, thus increasing the compression without raising the explosion temp. Tests showed an increase in thermal efficiency from 27 per cent to 34 per cent.

The usual vertical or horizontal ball governors (see STEAM ENGINES) are used on G. E. in 3 different ways, acting on a lever which (1) cuts off the entire fuel supply for one or more strokes until normal speed is restored ('hit and miss,'



Crossley-Premier Engines Ltd.

CROSSLEY-PREMIER 1500 B.H.P. GAS ENGINES IN DUPLICATE SET

This is the largest British-made set in the world, operating on natural gas, in Trinidad. Each engine has 12 cylinders arranged in 4 groups of 3. Two of these groups are placed on each side of a centrally disposed flywheel, to the arms of which the rotating field of the 1000-kw. alternator is bracketed

variation only penetrates a thin layer of the inner wall. This uneven and varying heating gives rise to cracks in the material and may lead to complete breakdown. Two methods have been suggested for dealing with this problem. In one method, due to Messrs. Crossley, a small spray of water is introduced into the cylinder during suction, the mist is converted into steam at the explosion thereby absorbing heat from the gases, but the steam also expands. Tests have shown an appreciable increase in efficiency over that of an engine working with water jacket only. The other method, suggested by Clark, consists in the injection of a further charge of air at the end of the

used on small engines only), or (2) cuts off part of the fuel (gas), thus reducing the thermal value of the mixture ('quality governing'), or (3) throttles the mixture on entering the cylinder, thus reducing the pressure. This is the method of 'quantity governing,' and is now used on all large engines.

Ignition of the gases was effected in the Otto engine by a gas flame admitted to the cylinder by a valve operated and timed by the engine itself. This method was later superseded by the hot-tube method, in which part of the gases pass through a short porcelain or platinum tube kept hot by a gas flame. Modern engines use ignition by electric spark, the spark gap

being placed in the cylinder, and usually supplied by a high-tension magneto (see MOTOR CARS).

Starting of small G. E. can usually be done by hand, but for engines larger than 30 h.p. it is necessary to have some other means of starting. Some engines are started by introducing a small explosive charge, but more often a special compressor is used or the valves are so set as to make the engine start as a compressor.

G. E. are made in sizes up to about 3000 h.p., and usually run at speeds of 80-300 r.p.m. Modern developments mainly concern the cooling and governing systems. Two types of continental 2-stroke engines merit special mention, the Koerting double-acting engine in which the long piston acts as part of the valve gear by covering and uncovering the exhaust port as explained above, and the Bechthausen engine in which there are 2 pistons in the cylinder, moving alternately towards and away from one another. The Fullagar engine works on a similar principle.

Gas Industry, British. The Gas Act, 1948, provided for the vesting, as from 1 May 1949, of former G. undertakings, whether limited, municipal, or G. holding companies, in one of the 12 area boards estab. by the Act. Each area board became responsible, as from the vesting date, for the supply of G. within its dist., together with the supply of coke and other residuals. Each area board was made responsible for balancing revenue with expenditure, taking one year with another, and was empowered to fix G. charges by means of a tariff. The B. G. I. is subject to the general control of the Minister of Fuel and Power, who is entitled to give directions of a general character either to the G. Council or the area boards. The G. Council was estab. by the Act for the purpose of advising the minister and promoting and assisting the efficient performance by the area boards of their functions. The G. Council has responsibilities with regard to research, training of employees, and the maintenance of machinery for negotiating terms and conditions of employment; it consists of a chairman, deputy chairman, and the chairmen of the 12 area boards. Under certain circumstances the G. Council can give directions to area boards.

Gas-liquor, watery fluid which, together with coal-tar (q.v.), forms the liquid product of the distillation of coal. This liquor, which separates as a layer above the tar, consists chiefly of a solution of ammonium salts, partly condensed from the hot gases and partly derived from the subsequent washing of the gas in the scrubbers. The carbonate and chloride are the most important of the salts present and occur to the extent of about 4 and 1.5 per cent respectively. Smaller quantities of the sulphide, thiosulphate, and sulphate are also present. G. was at one time the most important source of ammonia from the commercial point of view. This product is obtained from it by decomposing with lime, and blowing over

the ammonia with steam. If the sulphate, which is largely used as a fertiliser, is required, the gas is passed into sulphuric acid, and the salt crystallised out. Nowadays G. is of minor importance as a source of ammonia, which is mostly prepared synthetically from hydrogen and nitrogen.

Gas Manufacture. Gas is made by the destructive distillation of that variety of coal, rich in hydrogen, known as bituminous coal. A typical bituminous coal has the following composition: carbon, 77 per cent; hydrogen, 5 per cent; sulphur, 1.7 per cent; nitrogen, 1.7 per cent; oxygen, 7 per cent; ash, 3.5 per cent; moisture, 3.4 per cent.

The products of the distillation of coal may be divided into 3 main classes: (a) solids such as coke and gas carbon which is left on the walls of the retorts; (b) liquids consisting of tar and ammoniacal liquor; (c) gases consisting of the unpurified coal gas. The coal tar is a particularly valuable liquid and consists of an exceedingly complex mixture of hydrocarbons, phenols, etc. It contains more than 200 recognisable chemical compounds; some of the chief products obtained by distillation of tar into fractions are: (1) benzene and its homologues from which motor fuels and aniline, the source of coal-tar colours, are derived; (2) phenol or carbolic acid, used in the manuf. of plastics such as bakelite and in drugs such as aspirin and phenacetin; (3) naphthalene, used as a disinfectant and in moth-balls; (4) pitch, extensively used for road making. By chemical reactions on the many products obtained by the distillation of tar many valuable drugs, dyes, plastics, perfumes, and colouring matters are obtained.

The gases may be divided into (1) light hydrocarbons, such as methane, acetylene, ethylene; (2) other combustible gases such as hydrogen, carbon monoxide; (3) non-combustibles, such as nitrogen and carbon dioxide, and impurities, such as hydrogen sulphide and carbon disulphide and other organic sulphur compounds, and also ammonia. Of the last class, ammonia and hydrogen sulphide are completely extracted by purification processes, and frequently most of the organic sulphur compounds are also removed.

The series of operations involved in G. M. embraces the processes of distillation, condensation of the products of distillation which are liquid or solid at atmospheric temp., exhaustion of the uncondensed gas from the retorts, wet purification, by washing with water, dry purification, estimation of the vol. of the purified gas, and distribution to the mains from which the customer draws his supply. From the accompanying diagram an idea of the order in which operations in G. M. are carried out, and the arrangement of the plant, can be gained.

Retorts.—The distillation of coal is carried out by the following systems: (1) horizontal retorts; (2) continuously operated vertical retorts; (3) intermittent vertical retorts or chambers; (4) coke

ovens; although large amounts of gas are produced as a by-product in coke ovens, their main concern is with the manuf. of hard, dense coke for use in the steel industry. Most of the tn gas supplied by the gas industry is made in horizontal or vertical retorts.

Horizontal Retorts.—These are made of fire-clay or silica; their cross sections are usually beehive shaped (\square), a form adopted on account of the large heating surface presented by the base and the fact that it remains unchanged after continued heating. To the open ends of each retort

of heat. It is usual to have an admixture of steam with the primary air supply which forms carbon monoxide and hydrogen by contact with the hot coke. This system of heating possesses the following advantages: (1) A great economy of fuel; (2) a high temp.; (3) a uniform distribution of heat around the retorts. In modern installations the heat in the waste gases is used to preheat the secondary air used for combustion of the producer gas in recuperators, thus effecting a considerable economy in fuel. With a modern recuperative setting it is possible to carbon-

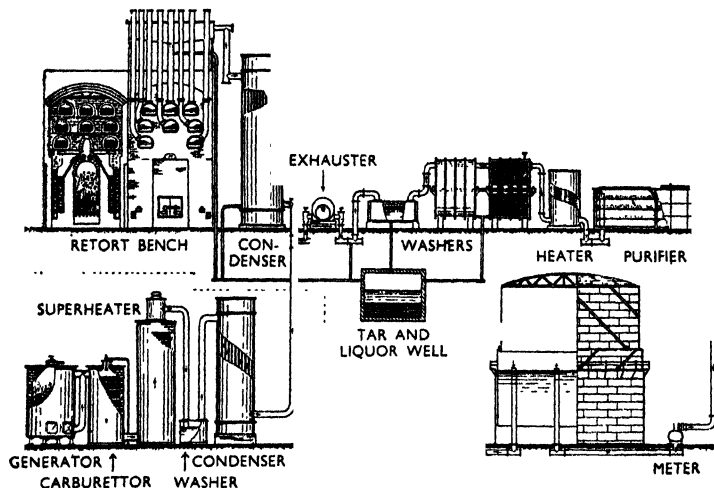


DIAGRAM OF A COAL-GAS PLANT

The lower left-hand position shows carburetted water-gas plant, which is not always used

a cast-iron mouthpiece is bolted; this carries a socket to receive the pipe through which the gases pass after leaving the retort. The retorts are heated externally, being arranged in 'beds' of from 3 to 12. Each bed of retorts has a separate furnace and carbonisation takes about 8–12 hrs at a temp. of about 1000°C . Each retort is 20 ft long, 16 in. wide, 13 ins. high, and holds about 14-cwt of coal. The retorts are heated by the combustion of producer gas which is made by the passage of air through red-hot coke in a furnace or 'producer' placed below the bed of retorts. The oxygen of the air is converted into carbon monoxide, and the mixture of carbon monoxide and nitrogen enters the combustion chamber surrounding the retorts at a high temp.; it is here supplied with sufficient air to complete the combustion of the carbon monoxide to carbon dioxide, a reaction which is accompanied by the evolution of a great quantity

of heat. It is usual to have an admixture of steam with the primary air supply which forms carbon monoxide and hydrogen by contact with the hot coke. This system of heating possesses the following advantages: (1) A great economy of fuel; (2) a high temp.; (3) a uniform distribution of heat around the retorts. In modern installations the heat in the waste gases is used to preheat the secondary air used for combustion of the producer gas in recuperators, thus effecting a considerable economy in fuel. With a modern recuperative setting it is possible to carbon-

Vertical Retorts.—Carbonisation in vertical retorts may be continuous or intermittent. In the case of the former coal is fed continuously into the top of a

retort by means of gravity, and is carbonised in its passage through the retort, coke being extracted by a slowly moving mechanical extractor at the base. As the coal is carbonised it swells considerably, and in consequence the retorts are wider in both dimensions at the bottom than at the top. The retorts in cross-section are either rectangular (e.g. Woodall-Duckham system) or oval (e.g. the Glover-West system) and are of various sizes to carbonise from 3 to 12 tons per day. The actual amount of coal passing through the retort depends upon the class of coal being carbonised and the calorific value of the gas produced. Steam is introduced at the base of the retort for the primary purpose of cooling the coke before it is discharged, but in so doing it produces water gas, thus increasing the gaseous yield. With continuous vertical retorts there is great possibility of flexibility in output and calorific value through variations in the rate at which coal is carbonised and in the amount of steaming. Steam is generated in waste-heat boilers in which the heat of the waste gases is utilised. Carbonisation in intermittent vertical chambers is not unlike that in horizontal retorts, except that coal is fed into the retort by gravity from overhead charging machines, and the coke is similarly discharged by gravity into a coke car, which is then cooled by means of water in a quenching tower. Carbonisation takes 12 hrs and steam is admitted for the last 2 hrs. The retorts are made in various sizes to accommodate from 1 to 5 tons of coal. Full accounts of various installations of continuous and intermittent vertical retorts may be found in the *Transactions of the Institution of Gas Engineers*.

Hydraulic Main.—The gas passes from the retort to the hydraulic main. This is a long horizontal tank supported above the top of the retort stack, through which is maintained a constant slow stream of water, the level of which is not allowed to vary. The ascension pipe dips about 1 in. into the water, which acts as a seal to allow any retort to be charged singly without the possibility of gas produced in the other retorts of the same bed escaping through the open retort. Some of the high boiling constituents in the gas condense in the ascension pipe, which must be periodically cleaned. In the hydraulic main, where the gas bubbles through water, condensation takes place to a still great extent, and also solution of a considerable quantity of ammonia. The products of condensation form a black, viscous fluid of peculiar smell called coaltar, which is a mixture of an extremely complex character. The tar, being heavier than the ammonia liquor, forms a layer at the bottom of the main, and the ammonia liquor is run off from the top of it at a constant rate into a storage tank. The gas leaves the main at a temp. of about 80° C., and is reduced to the temp. of the air by condensers which are air-cooled or water-cooled, or both. Water condensers are more efficient, because the degree of cooling can be better regulated

with water than with air. The efficiency of a condenser is judged by the efficacy with which it removes naphthalene; this compound condenses to a white glistening solid, which causes great trouble when it is deposited in the works or distributing pipes.

The Exhauster.—Since the stream of gas has to work against the pressure of the seal in the hydraulic main, the pressure of the gas in the retort must be greater than the pressure in the combustion chamber surrounding it. Some of the gas would naturally percolate through the porous wall of the retort and be consumed in the chamber. The exhauster is a rotary gas pump, which serves the purpose of sucking the gas out of the retort and thus neutralises the effect of the water pressure. The exhauster also serves to force the gas through the purifying plant. The amount of gas produced is increased through the use of an exhauster by about 10 per cent and, moreover, the quality of the gas is improved, because it leaves the heated retort more quickly. After leaving the condensers, the gas contains the following impurities which must be removed: (1) Hydrogen sulphide; (2) carbon disulphide; (3) carbon dioxide; (4) ammonia.

Wet Purifiers or Washers.—These contain ammonia liquor through which the gas is made to flow in finely divided streams. The compounds hydrocyanic acid, carbon dioxide, and hydrogen sulphide are acidic, so they combine with the ammonia (a base) to form salts which are non-volatile. The greater proportion of these impurities are therefore removed. The final removal of the ammonia is effected in scrubbers, in which the ascending coal gas meets a descending spray of water.

Dry Purifiers.—The final purification is effected by passing the gas over wooden trays made in the form of grids and covered with the purifying material. Oxide of iron, called bog iron ore, is used as the purifying agent. The oxide of iron removes the last traces of hydrogen sulphide. Sulphide of iron is formed, and by regulated introduction of about 2 per cent of air into the gas at this stage, together with a trace of ammonia, this sulphide is continuously re-oxidised to iron oxide and free sulphur. The oxide begins to lose its efficiency when it contains about 55 per cent of free sulphur and is then sold to manufacturers of sulphuric acid to be roasted in kilns for the production of sulphur dioxide. Carbon disulphide is removed by passing the gas over a nickel catalyst at 450° C., the hydrogen sulphide formed being removed as above. The coal gas is then stripped of benzole and naphthalene and passed to the gas holder where it is stored. In small gasworks the holder is a simple cylindrical vessel inverted in a tank of water. Large gasworks have adopted a telescopic cylindrical vessel, thus saving much ground space, as the same sized tank serves for a holder of much greater capacity than the simple form. The tankless holder consists of a tall cylinder or polygon in which the gas is confined by a large sealed

piston which rises and falls according to the amount of gas in the holder. Such a holder gives the same pressure whatever the height of the piston. The holders of this type now constructed in Great Britain have an aggregate capacity of about 74,000,000 cub. ft. An advantage of these holders is that, not being stored over water, the gas does not go into the mains saturated with water vapour, as is the case with ordinary holders.

Gas for fuel or power is prepared by the incomplete combustion of coal or coke. There are 2 methods of producing gaseous fuel, entirely different in principle:

(1) Air is passed upwards through a deep layer of red-hot carbon at 1000 to 1200° C. The carbon combines with the oxygen of the air to form carbon monoxide, CO. The nitrogen of the air is unaffected, so the resulting gas consists of a mixture of carbon monoxide and nitrogen, with a small percentage of carbon dioxide, CO₂. This mixture is called *producer* or *Siemen's gas* and since it is of low calorific value due to incombustible nitrogen it is used as soon as it is made which enables the heat the gas possesses by virtue of its high temp. to be utilised. (2) Steam is passed through red-hot carbon when the following reaction takes place. $C + H_2O \rightarrow CO + H_2$. The mixture of carbon monoxide and hydrogen is called *water gas*, which differs from producer gas in that it is wholly combustible. The reaction by which water is produced is endothermic in character, because the amount of heat required to decompose 1 gramme molecule of steam is greater than the amount of heat liberated when C combines with O to form CO. This explains why steam directed upon incandescent coke will produce water gas only for a very short time. The heat required for the reaction is absorbed from the hot coke which is cooled to such an extent that at first a gas of different composition from water gas is formed, and quickly the process ceases altogether. This difficulty is overcome by blowing air and steam alternately through the coke for periods of a few min. each. During the first stage, producer gas is formed with the evolution of heat. This heat is employed in raising the temp. of the remaining mass of fuel which soon attains the temp. appropriate for the reaction $C + H_2O = H_2 + CO$. This reaction, being endothermic, abstracts heat from the hot fuel which cools down, so that the process must be reversed by blowing air in, and so on. Hence in all processes for the manuf. of water gas, 2 alternating operations are involved: (1) The temp. of the fuel is raised to about 1200° C. by blowing a current of air through it; (2) steam is injected until the temp. falls to about 900° C. If the temp. falls below 900° C. the reaction $C + 2H_2O = CO_2 + 2H_2$ predominates. In some plants, 2 generators are blown in parallel and run in series, a practice which is equivalent to using a shallow fuel bed for the blow and a deep bed for the run periods. The time of the flow period is thereby reduced and the time of run period increased.

Coal gas, water gas, and producer gas are all widely employed for industrial purposes, since they form clean, reliable, and easily manipulated fuels. By the Gas Regulation Act of 1920 coal gas is now sold not by the cubic foot as previously, but by heating power measured in therms (see also BILBY). One therm is equal to 100,000 Brit. thermal units, i.e. it is the amount of heat required to raise the temp. of 100,000 lb. of water 1 F. degree. See A. Meade, *New Modern Gasworks Practice*, 1934; and A. Key, *Gasworks Effluents and Ammonia*, 1938. See also GAS AUTHORITY, BRITISH.

Gas Meter. The G. M. was invented about 1815 by Clegg. Consumers' G. M.s are either wet or dry. The wet type has a measuring drum enclosed in a case containing water up to a level known as the water-line. The drum, which contains div. plates set at an angle, is caused to revolve by the gas pressing upon the surface of the water, arrangements being made to compensate for fluctuations in water level due to movement of the drum. The rotation of the drum spindle is communicated to a train of wheels and registered on dials.

The dry meter, which is much more extensively used, usually has a case of tinned iron, and is divided into 1 horizontal and 2 vertical compartments by div. plates. In each vertical compartment is a movable diaphragm with prepared flexible leather sides, thus making 4 chambers in the lower part of the meter. The gas enters and leaves the chambers alternately through valves which are made to open and close at the correct time. The alternate expansion and contraction of the diaphragms, like ordinary bellows, by the pressure of the gas is communicated by levers and cranks to the recording mechanism. There are various forms of pre-payment or slot meters for extending the sale of gas among the smaller consumers. By means of a simple mechanism attached to the meter, and operated by the insertion of a coin, an amount of gas appropriate to the value of the coin is allowed to pass through the meter, after which a valve closes until another coin is inserted. Meters, as tested under the provisions of the Gas Act, 1948, are stamped as correct when their registration does not vary from the standard by more than 2 per cent in favour of the seller or 3 per cent in favour of the consumer, a total range of 5 per cent.

Gas Oil, a heavy distillate of petroleum, used in the form of diesel oil as a fuel for automotive diesel engines.

Gas Poisoning, see POISONS and RESUSCITATION.

Gas Space Heaters. As a fuel gas is clean and produces neither smoke nor soot. No fuel storage space is required, nor is the removal of ash involved. A gas fire will give an immediate and flexible supply of heat; the temp. of a room heated by a gas fire can be kept under close control merely by the operation of the tap on the fire. Since a gas fire is normally fitted to a flue, it will promote adequate and positive

ventilation of the room in which it is installed; a coal fire, on the other hand, needs a much larger flue to dispose of the smoke produced and, in consequence, causes a much higher rate of ventilation than is needed. This results very often in unpleasant draughts and an undesirable wastage of heat up the flue.

Most of the heat from gas fires is by radiation, but later types, called convector fires, produce in addition a certain amount of convected heat in the form of warmed air, which is directed into the room and which further increases the total heat output of the fire. Gas fires of both the radiant and convector types are designed to give an efficient and wide distribution of heat, the first type in the form of well distributed radiant heat, and the latter with an additional circulation of warm air. The output of heat from a gas fire, as compared with the heat input in the form of fuel consumed, is about 50 per cent in the case of the normal fire, and 60 to 65 per cent in the case of a well-designed convector fire. The modern gas fire is silent in operation, and requires very little attention to maintain it in good working order; it has radiants which are much more robust than the older types. Automatic ignition is usually provided.

From an artistic point of view gas fires can be made to harmonise with any scheme of decoration. They may be designed to be fitted at hearth level or raised to a convenient height to form a panel nearly flush with the face of the wall. Small portable gas fires are also available to give local warmth by radiant or convected heat, or a combination of the two. These, as a general rule, need no flue. Another form of domestic gas heater is the flueless radiator, which either stands on the floor or is fixed to the wall; this heats mainly by convected warm air which gives a background of warmth to the whole house. Balanced flue radiators have special ducts which pass through the wall behind the appliance, so that both the intake of air for the combustion of the gas and the discharge of the gaseous products of the combustion are connected to the outside air. Many premises of a commercial and industrial character are heated by gas convectors of a larger size than the domestic type, and also by overhead heaters of various designs which employ radiation to warm the occupants of the premises. Gas space heating appliances lend themselves admirably to automatic controls arranged to maintain the temp. of the premises at a desired level.

Gas Turbine, *see* AERO-ENGINES and JET PROPULSION.

Gas Water Heaters. Modern G. W. H. fall under 2 main headings: instantaneous and storage. In the former water is heated as it passes through the appliance; the supply is instantaneous and continuous so long as the hot-water tap is turned on. In the latter a quantity of water is heated and stored for use as desired. Single point instantaneous heaters serve 1 hot tap; multipoint heaters can deliver

hot water to every hot tap in the home. They have a high thermal efficiency, but the rate of gas must be sufficient to provide the heat needed to cope with the rate of flow of the water. The multipoint heater is connected up to a cold-water supply, and to the hot-water pipes of the house. It incorporates a small pilot jet, and operates automatically by the opening and closing of the hot tap at bath, basin, or sink. A common type of multipoint heater delivers about 2 gallons of hot water per min. at bath temp. The provision of an automatic device prevents gas passing to the main jets should the pilot be extinguished. Bathrooms in which instantaneous G. W. H. are fitted must have adequate ventilation. Multipoint and bath-type single-point instantaneous, and the larger storage, G. W. H. need to be fitted with efficient flues.

Storage G. W. H. can be subdivided into 2 types: the circulator and the self-contained storage heater. The circulator is designed for connection by external flow and return pipes to an independent storage cylinder which should be lagged, or it can be inter-connected with an existing system to work as an alternative to, or in conjunction with, a solid fuel boiler. In the latter case the existing storage cylinder is used. The self-contained storage heater consists of a completely lagged storage vessel and a heating unit as one appliance and can, if required, be connected to an existing system to work as an alternative to a solid fuel boiler. In both cases the rate of draw-off is determined by the head of water available, and by the bore of the draw-off pipe to, and the size of, the tap concerned.

With storage water heaters water is heated until the full quantity is stored at the predetermined temp. in a tank or cylinder, which should be insulated; the gas consumption is then automatically reduced by thermostat to a rate sufficient to maintain the water at that temp. When hot water is drawn off the gas rate is automatically increased. Instantaneous and storage heaters are made in sizes to serve the kitchen sink or the whole house; some types provide hot or boiling water for kitchen needs. In the home gas is also used for heating the water in boilers and washing machines used for clothes washing. Large gas-fired plants provide hot water for commercial premises or heat the water in swimming baths. Specially designed heaters provide a continuous supply of boiling water for use in cafés, restaurants, etc.

Gascoigne, *see* GASCONY.

Gascoigne, Golfe de, *see* BISCAY, BAY OF.
Gascoigne, George (c. 1525-77), poet and dramatist, b. Cardington, Beds, the son of Sir John G. He was educ. first at Canterbury and then went to Trinity College, Cambridge. In 1555 he was entered at Gray's Inn, and from 1567 to 1559 was M.P. for Bedford. Owing to his prodigality he was disinherited by his father, and fled from his creditors to Holland, where he took service under the Prince of Orange against the Spaniards.

from 1572 to 1575. On his return he accompanied Queen Elizabeth on one of her royal progresses, and to celebrate the event wrote a masque entitled *The Princely Pleasures, at the Court at Kenilworth*, 1576. His well-known satire in blank verse, *The Steele Glas*, appeared in the same year. This satire on the vices and foibles of the age shows monarchs, soldiers, prelates, merchants, and peasants as they really are, without flattery or idealisation, as in the crystal glass 'wherein all men choose to look.' He is also the author of the *Supposes*, 1573, a trans. of the *Suppositi* of Ariosto and the earliest extant comedy in Eng. prose; *Jocasta*, 1573, a version of the *Phoenissae* of Euripides, the second earliest tragedy in blank verse; *The Glasse of Government*, 1575, and the *Complaynte of Phylomene*, 1587. Mention may also be made of his prose romance, *The Pleasant Fable of Ferdinando Jeronimi*, 1587, which, in its sentimental colloquies and alliterative style, is a forerunner of *Euphues*; *Dan Bartholomew of Bath*, 1573, a kind of novelette in verse; and the *Fruit of Fethers*. He also wrote *Certain Notes of Instruction concerning the Making of Verse or Rhyme in English*, 1575, said to be the first attempt at a treatise on prosody in the language. He is, however, much more entertaining in undisguised verse-narrative of his own experiences, as in *The Voyage into Holland*, 1573, and *Dulce Bellum Inexpertis*, 1575—the last-named giving a vivid picture of his experiences in Flanders. His works were ed. by W. C. Hazlitt, 1869–70, and J. W. Cunliffe, 1907–10. See G. Whetstone, *A Remembrance of the wel employed life and godly end of George Gas Koynge, Esquire*, 1577 (ed. by E. Arber, with *The Steele Glas*, 1868); and studies by F. E. Schelling, 1893, and C. T. Prouty, 1942.

Gascoigne, Sir William (c. 1350–1419), lawyer; eldest son of Wm G., b. in Yorks. In 1397 he became one of the king's serjeants and was appointed attorney to the banished duke of Hereford. He was made chief justice of the king's bench in 1400, and in 1403 was commissioned to raise forces against the insurgent earl of Northumberland. The stories told about him, that he committed Prince Henry for contempt of court and that he refused to judge Archbishop Scrope on the ground that he had no jurisdiction over spiritual persons, prove that he was regarded as a just judge, possessed with a high sense of the dignity of his office and indifferent, in the pursuit of duty, to his personal interest.

Gascoigne, see GASCONY.

Gascony (Fr. *Gascogne* or *Gascogne*), old prov. in the SW. of France. It derived its name from the Vasques, or Vascones, a Sp. tribe which crossed the Pyrenees about 580. It now forms the depts of Landes, Gers, Hautes-Pyrénées, and part of Basses-Pyrénées. Formerly it was a dependency of Guyenne (q.v.), and its cap. was Auch. Part of it belonged to the sovereigns of Navarre, and it was united to France in 1598.

Gascoyne-Cecil, James Edward Hubert, and Robert Arthur James, see SALISBURY, MARQUESSES OF.

Gaskell, Elizabeth Cleghorn (1810–65), novelist, b. Chelsea. She was the daughter of Wm Stevenson, a Unitarian minister and keeper of the treasury records. Most of her youth was spent at Knutsford, Cheshire, and this quaint tn supplied her with her material for *Cranford*. In 1832 she married the Rev. Wm G., a Unitarian minister of Manchester, and the marriage proved a very happy one. In 1848 she became famous by the pub. of her novel *Mary Barton*, in which she depicts with insight and sympathy the life and feelings of the manufacturing working classes. The book was a



ELIZABETH CLEGHORN GASKELL

great success and was praised by Carlyle, Maria Edgeworth, and Landor. She was a friend of Dickens, and was intimately acquainted with both Carlyle and Thackeray. It was at Dickens's invitation that she wrote for *Household Words*, and in this paper appeared, from 1851 to 1853, *Cranford*, which, according to Lord Houghton, is 'the purest piece of humorous description that has been added to British literature since Charles Lamb.' She has some of the characteristics of Jane Austen, and if her style and delineation of character are less minutely perfect, they are, on the other hand, imbued with a deeper vein of feeling. She was the friend of Charlotte Brontë, to whom her sympathy brought much comfort, and whose life she wrote, 1857. Her other novels were *Lizzie Leigh*, 1853, *Truth*, 1855, *North and South*, 1855, *Sylvia's Lovers*, 1863, and *Mr Harrison's Confessions*, 1865. Her last work was *Wives and Daughters*, 1865, which appeared in the *Cornhill Magazine*, and was left unfinished. The fullest ed. of her works is that of C. K. Shorter (11 vols.), 1906–19. See E. A. Chadwick, *Mrs Gaskell: Haunts, Homes, and Stories*, 1910;

and Elizabeth Haldane, *Mrs Gaskell and Her Friends*, 1930; also lives by J. J. van Dulleman, 1924; G. A. Payne, 1929; A. S. Whitfield, 1929; and G. de W. Sanders, 1930.

Gasoline is a fraction of petroleum produced by distillation within the approximate range 20–180° C. It is the main constituent of petrol, which is often known by this name. See PETROL; PETROLEUM REFINING.

Gasometer, see GAS MANUFACTURE.

Gasparri, Pietro (1852–1934), It. cardinal, b. Ussita; educ. at the Pontifical Seminary, Rome. He became prof. of canon law, Catholic Institute, Paris, 1880–98. In 1898 G. went to South America as apostolic delegate, where he remained until 1901. He was entrusted, 1904, by Pius X with the codification of canon law. Cardinal, 1907; secretary of state, 1914. He conducted negotiations leading to the Lateran Treaty between the Vatican and the It. Gov., which was signed 11 Feb. 1929.

Gaspé Peninsula, E. section of the prov. of Quebec, Canada, between Gulf of St. Lawrence and Chaleur Bay. It consists mainly of forest land and has good fisheries. Area 4450 sq. m.

Gasperi, Alcide de (1881–1954), It. politician, educ. at Trento and Vienna Univs. He was the president of the Popular party when he was arrested by the Fascists in 1926; he took no further part in political life until the downfall of Mussolini. After the Second World War he became leader of the Christian Democrats; he was foreign minister 1945–6 and 1951–3, and Prime Minister 1945–July 1953, when he resigned after his eighth consecutive ministry, this time made up entirely of members of his own party, had been defeated in Parliament. His previous ministries had been coalitions. G. was instrumental in restoring his country to a major international status after her war-time defeat; he brought her into the W. alliance, and his domestic policy, with its emphasis on progressive moderation, did much to restore the devastation of the war years, and to combat the growth of Communism in Italy. His long period of office (though the ministries he headed varied in their composition slightly) gave Italy a period of relative political stability which encouraged her economic and moral revival as a democratic nation. G. was undoubtedly the outstanding figure in It. politics in the immediate post-war era.

Gasquet, Francis Aidan (1846–1929), cardinal and historical writer, b. London. He was educ. at Downside College, Bath, and from 1878 to 1884 was prior of the Benedictine monastery and college of St Gregory, Downside. Up to his death G. was the abbot president of the Eng. Benedictines and president of the international commission for the revision of the Vulgate, in virtue of which he was created cardinal-deacon by Pius X in 1914. On the occasion of his sacerdotal jubilee Pius XI raised him to the dignity of cardinal-priest. He wrote many works

on pre-Reformation monasticism in England but, although exceptional at the time, they are now largely superseded. His works include *Henry VIII and the English Monasteries*, 1888–9, *A Short History of the Catholic Church in England*, 1903, *English Monastic Life*, 1903, *Parish Life in Medieval England*, 1906, *The Greater Abbeys of England*, 1908, *Monastic Life in the Middle Ages*, 1922, and *His Holiness, Pope Pius XI*, 1922.

Gassendi, or Gassend, Pierre (1592–1655), Fr. philosopher and mathematician, b. Champtercier in Provence. He studied at Aix with a view to entering the Church, but abandoned the idea and took up the study of philosophy. He made an examination of the Aristotelian systems, and pub., in 1624, *Exercitationes paradoxicae adversus Aristotelem*, in which he protests against the acceptance of the dicta of Aristotle as final in all matters of philosophy. In 1645 he was made prof. of mathematics at the Collège Royal in Paris. While there he wrote his main work, *Syntagma philosophiae Epicuri*, 1649, which contains a complete sketch of the system of Epicurus. G. was a disciple of Bacon and friendly with Galileo (q.v.), keeping pace with the moderns in natural and physical science. His *Institutio astronomica* is a book on the science of his own day, while *Tychonis Braheii, Nicolai Copernici, Georgii Puerbachii, et Joannis Regiomontani Vitae* contains a complete hist. of astronomy down to his own time. G.'s complete works were pub. in 6 vols., 1658. See G. S. Brett, *The Philosophy of Gassendi*, 1908.

Gasset, José Ortega y, see ORTEGA Y GASSET, JOSÉ.

Gassmann, Florian (1729–74), Bohemian conductor and composer, had a Jesuit education and studied music with Padre Martini at Bologna. He began by producing operas at Venice and ballet music in Vienna, where he became court conductor in 1772. Apart from over 20 operas, more than half of which were produced in Vienna, but all of which are in Italian, he wrote more than 50 works for the Church, as well as 16 symphonies and chamber music.

Gastein, valley in the prov. of Salzburg, Austria, known for its scenic beauty. Its prin. towns are Badgastein and Hofgastein (qq.v.).

Gaster, Moses (1856–1939), Rumanian philologist and Heb. scholar, b. Bucharest. Lecturer in the univ. of Bucharest, 1881–5, but exiled from Rumania for his activity on behalf of the persecuted Jews. In 1886 and 1891 he was Ilchester lecturer in Graeco-Slavonic literature at the univ. of Oxford, and in 1887 he was appointed Haham of the Sephardic communities of England. He played a prominent part in the learned life of London and was president of a number of learned societies. His writings cover a very wide field, and include *History of Rumanian Popular Literature*, 1883, *Rumanian Translation of the Hebrew Prayer-Book*, 1883, *Graeco-Slavonic Literature*, 1887, *Chrestomathie roumaine*, 2 vols., 1891, *The Chronicles of*

Jerahmeel, 1899, *Hebrew Illuminated Bibles*, 1901, *The Jewish Divorce*, 1911, *Rumanian Fairy Tales*, 1923, *The Ketubah*, 1923, *The Samaritans*, 1925, *Studies and Texts in Folklore, Magic, etc.*, 3 vols., 1925-8, *Conjurations and the Ancient Mysteries*, 1932, *Samaritan Eschatology*, 1932, *The Maaseh Book* (Eng. trans., 2 vols.), 1934, and contributions to the *Ency. Brit.* and *Hastings's Encyclopedia of Religion and Ethics*.

Gasteropoda (Gk *gaster*, stomach, and *pous*, foot), name given to one of the 3 large classes into which molluscs are divided and, as the name indicates, all its genera are characterised by the ventral position of the foot. The head and foot are bilateral, but the viscera undergo varying degrees of torsion; the reproductive organ and genital duct are single. The free-swimming forms known as Heteropoda sometimes acquire a superficial symmetry. The Streptoneura, as their name implies, are G. in which the nerve loop is twisted, owing to the asymmetry of the viscera already mentioned—they include *Patella*, the limpet, *Littorina*, the whelk, *Purpura*, the dogwhelk, etc.; the Euthyneura, or straight-nerved, include the Opisthobranchs, *Aplysia* (the Sea Hare), *Bulla*, *Doris*, *Colts*, etc.; and the Pulmonata *Helix*, the snail, *Arion*, the black slug, etc. Some gasteropods are voracious animals, being furnished with powerful rasping organs which enable them to prey on other marine molluscs, while the terrestrial forms, such as snails, work havoc among flowering plants and vegetables; many of them—whelks, etc.—are used for human consumption and as bait. Fossil gasteropods occur in the Cambrian rocks, and many modern types have their origin in Cretaceous times.

Gaston de Foix, see FOIX and FOIX, GASTON DE.

Gastroctomy. This operation consists in removal of part or the whole of the stomach for the purpose of excising an ulcer or a cancer. Continuity of the alimentary canal is re-established after the removal of the stomach, or part of it, by anastomosing (joining) the first part of the duodenum to that severed part of the stomach which is nearest to the oesophagus. See PEPTIC ULCER.

Gastric Juice, colourless acid fluid, secreted by certain cells in the stomach, containing enzymes and hydrochloric acid in addition to small amounts of organic and inorganic materials. The prin. enzyme, or ferment, present is pepsin, which is derived from a precursor, propepsin. The latter, on coming into contact with acid, is converted into the ferment which acts upon the protein of the food. Pepsin therefore can only act in acid solution, and both the ferment itself and the hydrochloric acid of the G. J. are secreted by special cells in the stomach. The amount of the secretion, and also its composition, is determined by the nature of the food. Pepsin acts on protein matter, converting it into soluble forms, albumoses and peptones, which are

passed on to the intestine, there to undergo further change. Another ferment, rennin, is also present in G. J.; it brings about the clotting of milk by catalysing the change of caseinogen into casein. Recently another substance has been identified by Castle (Castle, W. B., Amer. physician, b. 1897) in G. J., and has been named Castle's intrinsic factor. Together with the extrinsic factor, which is contained in certain foods such as beef muscle and yeast, the intrinsic factor produces the blood-forming substance (the anti-pernicious anaemia principle) which is stored in the liver, from whence it is liberated to promote the development of red blood corpuscles. The exact nature of these factors is not known but the anti-pernicious anaemia principle of the liver appears to be folic acid, a vitamin of the B complex.

Gastritis, see STOMACH; (in horses) see HORSE DISEASES.

Gastroenterostomy, the operation of making a passage from the stomach to the small intestine (jejunum), thus short-circuiting the duodenum. The object is to prevent food passing through the pyloric end of the stomach and the duodenum so that an ulcer of these parts may be freed from irritation and given a chance to heal. See PEPTIC ULCER.

Gastrolobium, genus of leguminous plants, contains over 30 species, all of which are evergreen shrubs found in W. Australia.

Gastronomy, the science or art of good eating. The first gastronomic experiments were probably purely accidental, but for over 3 thousand years deliberate experiments have been made. The earliest gastronomists discovered that cooked fish and meat were more appetising than raw foods. Hunger, local conditions, and the natural pleasure derived from palatable food have combined to continue the experiments until we arrive at *sauce tartare* with sole, mint sauce with lamb, red-currant jelly with game, etc. In the experimental field the Fr. have been the foremost gastronomists and have discovered many attractive and unusual food combinations. Like most arts, that of G. has frequently become debased, for at times it has degenerated into gluttony. For the consumer, the best expression of the art is in the enjoyment of appetising dishes eaten with the fullness of appreciation that is accompanied by restraint. Modern G. as a science has to consider not only the combination of appropriate flavours but also the food value of the dishes. This value is assessed on the capacity of the food to supply fuel and building and regulative materials, balanced in the right proportions to meet the needs of the individual. See also COOKERY; FOOD AND DIET. See A. Brillat-Savarin, *Physiologie du goût*, 1825; E. and Lorna Bunyard, *The Epicure's Companion*, 1937; R. Hutchison, H. V. Mottram, and G. Graham, *Food and Principles of Dietetics*, 1948; and Constance Spry and Rosemary Hume, *The Constance Spry Cookery Book*, 1956.

Gastrostomy, operation of establishing an artificial opening into the stomach through the abdominal wall so that fluid nourishment may be passed directly into the stomach. It is performed when the gullet or oesophagus is obstructed, making normal swallowing impossible.

Gastrula, a stage in the early development of animals with 3 germ layers, which are all animals higher than the 2 layered coelenterates. The G. merely consists of ectoderm (the outer germ layer) and the endoderm (inner germ layer) and is a stage before the middle layer or mesoderm is formed.

Gatacre, Sir William Forbes (1843-1906), soldier, b. near Stirling. He commanded a brigade in the Sudan campaign of 1898. In the South African war he made an attempt to seize the railway junction at Stormberg. The attempt was unsuccessful and G. was blamed by Lord Roberts for his want of judgment. In 1900 he failed to come to the assistance of the troops at Reddersburg and was recalled. He retired as major-general in 1904.

Gatchina (after 1917 Trotsk, then Krasnogvardeysk until 1944), tn in the Leningrad Oblast of NW. Russia, 28 m. S. of Leningrad. In the 19th cent. it was a favourite residence of Russian emperors. The famous G. palace (1766) suffered great damage in 1941-4. Pop. (1936) 42,000.

Gate, Gateway. For gateways in medieval fortifications, see CASTLE and PORTCULLIS.

Gate of Tears, strait of Bab-el-Mandeb, in the Red Sea, so called from the shipwrecks associated with it.

Gates, Horatio (1728-1806), Amer. gen., b. Maldon, Essex, England. He took part under Braddock in the expedition to Fort Duquesne, which ended in disaster (1755). He escaped with difficulty and settled down in America. On the outbreak of the War of Independence he sided with the colonists and quickly made a name for himself. He obtained the N. command and forced the surrender of a Brit. army at Saratoga (1779). He then aimed at the chief command of the Amer. Army. In 1780 he was badly defeated at Camden by Cornwallis, and as a result of a court-martial was superseded. He finally retired to Virginia, and thence to New York, where he d. See life by S. W. Patterson, 1941.

Gateshead, municipal co. and parl. bor. of Durham, England. It is situated at a point where the Great North Road crosses on to the S. bank of the R. Tyne. The tn has been very largely restored since the great fire of 1854, which destroyed a very large part of it. The riv. is bridged in 5 places, and so connects the tn with Newcastle. The Shipcote dist. in the centre of the tn has many buildings noted for their architectural beauty; these include the Shipley Art Gallery and the Central Public Library. There is a fine grammar school, besides technical and art schools. The Queen Elizabeth Hospital (maternity and general wings), formally opened by H.M. the Queen in 1948, and the Infectious Diseases Hospital, both at Sheriff

Hill, provide the most modern hospital services. In Saltwell Park, 57 ac. in extent, G. has one of the finest tn parks in the N. of England. The tn has large iron-works and foundries, shipbuilding yards, tanneries, and soap works. The industrial feature of the tn is the Team Valley Trading Estate, of 700 ac., estab. by the gov. and planned for factory accommodation. It has its own internal railway connecting with the local railway station, and recreational centres, etc., for employees. It has attracted many new industries and assisted in the post-war (1945) industrial development of G. G. is thought by some to have been the Rom. military station of *Gabrosentum*, named in the Itinerary (q.v.). There has been some doubt as to the origin of the place-name, but it is probably derived from 2 A.-S. words meaning 'head of a road,' for it was literally the 'head' of the Rom. road that led from Chester-le-Street to Newcastle. G. was first mentioned under its modern name towards the end of the 11th cent., in connection with the burning of the church and murder of the bishop of Durham by the populace—a tragic incident which arose out of the murder of an Eng. nobleman who had protested to the bishop against the exactions of his tax-gatherers. The tn obtained a charter from the bishop of Durham as lord palatine in 1164, and the common seal of the bor. is referred to in a charter of 1480, the inscription on which another charter was 'Sigillum commune de Gathshedde.' Rivalry and disputes subsequently arose with Newcastle over fishing and trading rights, and in the reign of Edward VI the 2 tns were united for a short time. G. remained under the nominal headship of the bishop of Durham until the end of the 17th cent. It became a parl. bor. in 1832 and a co. bor. in 1889. The tn was not given an M.P. until 1832. Some damage was done to the tn by bombing raids in the Second World War, chiefly to houses and small industrial concerns, but there were few fatal casualties. Pop. 113,600 (est.).

Gath, one of the royal cities of the Philistines, situated near the borders of Judah, the bp. of Goliath. During the early years of the Lat. kingdom of Jerusalem it was fortified by the crusaders. It fell into the hands of Saladin in 1191, but was recaptured in the next year by Richard I. The exact site of the tn is not now known, but Tell-es-Safi is supposed to occupy it.

Gâtinals, anct name for a dist. of France, SE. of Paris, now comprising the greater part of the depts of Seine-et-Marne and Loiret (qq.v.). It is traversed by the R. Loing, is low-lying and swampy, and is famous for its honey.

Gatineau, riv. of Canada, a trib. of the Ottawa, which has its source in some lakes situated in about lat. 48° N. and long. 75° 30' W. The direction of its course is chiefly SSW., and it eventually enters the Ottawa, after flowing 400 m.

Gatling, Richard Jordan (1818-1903), inventor of the Gatling gun, a species of machine-gun. He was an Amer. citizen

and an inventor of some note. He turned his attention in many directions and patented a sowing machine (for seeds) and a steam plough. In 1861 he patented his gun, which was of great service during the Amer. Civil war, but was much improved in 1865. By means of a revolving handle a constant rifle fire was kept up from 8 to 10 rifle barrels which revolved on an axis.

Gatooma, tn of Southern Rhodesia, 100 m. SW. of Salisbury. It is the centre of a cotton-growing country and the site of the State cotton-spinning mills and of sev. textile factories. It is also the centre of a mining area. Pop. (Europeans) 2000; (Africans) 8000.

G.A.T.T., see GENERAL AGREEMENT ON TARIFFS AND TRADE.

Gatty, Margaret, see EWING, JULIANA.

Gatun, tn in N. Panama Canal zone, where part of the canal works, including 2 famous locks, are situated. G. lake, in the vicinity, has been converted into a reservoir by the construction of the G. dam. The dam is $1\frac{1}{2}$ m. long and $\frac{1}{4}$ m. wide at its broadest point, and 115 ft high. Pop. 2250.

Gau (German), self-governing community of the old Germanic state; later, in the Frankish empire, the dist. of a co. In Nazi Germany G. was applied to the unified political parts of the Reich, including occupied ters.

Gauchos, name given to the inhab. of the pampas of Argentina and S. Brazil. They are chiefly of Sp.-Amer. origin, but the strain is tinged with Indian blood. Their horsemanship is superb, and they are also exceedingly clever with the lasso and bolas. The habits of the people themselves are sordid. Gambling and profligacy are rife among the men, whilst the women are treated very badly. They are, however, externally polite and hospitable. Their whole life is rapidly being encroached upon by modernisation, both at work and by recreations such as the cinema and television.

Gaudeamus, Lat. student song of very anct origin. The name is derived from the first word of the song, 'Gaudeamus igitur, juvenes dum sumus' ('Let us then rejoice while we are young'). It is still extremely popular in the student world, especially in Germany and in Scotland. A modified version of an adaptation dating from 1776 appears in *The Scottish Students' Song-book*.

Gauden, John (1605-62), Eng. writer and bishop, possibly author of the *Eikon Basilike* (q.v.). He was b. at Mayland, Essex, and educ. at St John's College, Cambridge. He became chaplain to Robert Rich, earl of Warwick, who was one of the parl. leaders. At first his sympathies were with the Parliament, but the excesses of the advanced parliamentarians drove him to the Royalist side. He became bishop of Exeter after the Restoration, and later became bishop of Worcester. G. claimed authorship of the *Eikon Basilike* but the actual identity of its writer remains a mystery.

Gaudens, Augustus Saint-, see SAINT-GAUDENS.

Gaugamela, vil. in Assyria, situated near the anct site of Nineveh, and near the modern tn of Mosul. The battle which is usually called Arbela was fought near here, and the tn from which it receives its name is in reality some 30 m. further E. At this battle Alexander the Great defeated the Persians under Darius III, 331 BC. See ARBELA.

Gauge, term applied to the width of a railway track. The G. varies in different countries, and depends upon the measurements adopted by most of the railways. The measurement is made from inside to inside of the head of the rails. The measurements for some of the countries of the world are 3 ft 6 in. in parts of Australia and South Africa, Egypt, and the Sudan; 4 ft 8 $\frac{1}{2}$ in. in Great Britain, most European countries, and in U.S.A. Tramway G.s are usually 4 ft 8 $\frac{1}{2}$ in. Narrow G. lines are used for the sake of economy in preference to standard G., because the rolling stock is lighter and cheaper; more important is the fact that with the contraction of G. the engineer is able to sharpen his curvature, and thus, in rugged country, adapt his routes to the folds of the hillsides. High speeds, however, are not possible.

Gauguin, Paul (1848-1903), Fr. painter, b. Paris. Son of a Fr. journalist and a mother of Sp.-Peruvian origin, he was taken as a child to Peru; on his mother's return he entered the merchant service. After the war of 1870 he went into a Paris bank and was financially successful. He married a young Dan. woman, 1873. He began to paint in his spare time, being influenced by the Impressionists, especially Pissarro. In 1883 he gave up both family and financial career to paint. In 1886 he was painting at Pont-Aven in Brittany. After his famous stay with Van Gogh at Arles he set sail for Tahiti—an escape from civilisation—and from 1895 quitted Europe for ever, living in poverty and isolation but leaving many records of 'a riot of light and vegetation among a gentile people.' He was a 'post-impressionist' in his free use of colour, indulging 'in colour combinations of unsurpassed liberty.' The roads were red, the fields violet, tree-trunks green, and foliage yellow; yet 'the ensemble gives one a feeling of truth' (Raymond Cogniat, 1947). His work was marked also by a new simplicity of design (in which the style of Puvis de Chavannes can be traced). He ranks as one of the founders of 20th-cent. art and his Brittany and Tahitian paintings are both highly valued. His last important work was a native group entitled 'D'où venons-nous? Que sommes-nous? Où allons-nous?' A friend of Mallarmé, he was of far from 'primitive' intellect, as his letters, journals, and the writings collected under the title *Noa-Noa* reveal. See also FRENCH ART. See lives by P. G. Rotonchamp, 1906; B. Becker, 1931; R. Burnett, 1936; and R. Cogniat, 1947; also *Lettres à D. de Montfried*, ed. by V. Segalen, 1918, and *Letters to his Wife and Friends*, ed. by M. Malingue, 1948.

Gauhati, or Gowhatty, tn of Assam state, India, standing on the Brahmaputra, 70 m. E. of Goalpara. It is the largest tn in Assam, and until superseded by Shillong in 1874 was the centre of Brit. administration. It is still an important trading centre, and is remarkable for the number of ruined temples, etc., in its vicinity. The temple of Kamakhya is a Hindu place of pilgrimage.

Gaul, Gilbert William (1855-1919), Amer. painter, b. Jersey city, New Jersey. He became an associate, National Academy of Design, 1880, and academician, 1882. He painted 'Indian Girl,' 1880, and 'Old Beau,' 1881. He specialised in battle-pictures—especially scenes from the Civil war, e.g. 'Charging the Battery,' 'Saving the Colors,' 'Battery H in Action' (in the Toledo Museum), 'Silenced,' 'Exchange of Prisoners' (in Democratic Club, New York), and 'Guerillas returning from a Raid.'

Gaul, see GALLIA; FRANCE.

Gaulle, Charles de (1890-), Fr. soldier, b. Lille. In 1910 he entered the military academy of St Cyr. At 21 he was given a commission in the 33rd Infantry Regiment. His commanding officer was Pétain (q.v.), then a colonel. G. became a company commander in Pétain's regiment during the First World War. He fought at Douaumont (q.v.), Verdun, and was captured by the Germans. After the armistice he served as a major under Weygand (q.v.) during the 1920-1 Bolshevik campaign in Poland. Then he returned to St Cyr as prof. of military hist. His success led to his being sent to the École de Guerre, the Fr. staff college, when he became aide-de-camp to Pétain, the commander-in-chief. In 1929 he was sent on a secret mission to Iraq, Persia, and Egypt. In 1932, as general secretary of the Committee of National Defence, he reached a post from which he could propound his theories on mechanisation. In 1937 he was given command of the 507th Regiment of Tanks, from which he rose, with the rank of colonel, to command the tank brigade of the Fifth Lorraine Army. On 15 May 1940, the day before he was allowed to demonstrate his theories on the battlefield around Laon, he became brigadier-general in command of the 4th Armoured Div. He then tried to induce Pétain, Weygand, and Reynaud (Prime Minister) to allow him to defend the Marne, the Seine, or Paris. Reynaud finally consented to let him establish his defences around Bordeaux, and the seat of gov. was moved there. But he was now fighting virtually alone. The Fr. Gov. had decided to capitulate. He strove to steel Reynaud's courage to continue the fight in Africa, and flew to London to ask for the necessary shipping. His request was granted, but it was too late. Reynaud had resigned, and de G. realised that the only place to continue the struggle for France was from London. He founded there a Fr. National Committee, over which he presided, and himself assumed the title of leader of all Free Frenchmen, and began to organise a Fr. Army and

Navy in Britain. He failed in an attempt to seize Dakar, but was successful in bringing the Chad and Fr. Equatorial Africa over to the Allies.

He was commander-in-chief of the Fighting Fr. Forces controlled by the National Committee until 1943, when he became president of the Committee for National Liberation. After the entry of the Allies into Paris he became head of the Fr. Provisional Gov. and chief of the armed forces. The elections of 1945 confirmed him as president of the gov.,



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GENERAL DE GAULLE

minister of national defence, and head of the armles. In 1946 he resigned on the grounds that his task was ended, but re-entered the political arena in 1947 as leader of the Rassemblement du Peuple Français, an organisation which claimed to be a movement for the regeneration of France rather than an ordinary political party. The Rassemblement, after winning sweeping successes in the general election of 1951, soon assumed a normal political role. De G. withdrew from it in 1953 and in the 1956 general election it lost most of its seats.

His reputation as a professional soldier was enhanced by the pub. of *Vers L'armée de métier*, 1934, in which he advocated a small highly trained professional army more nearly approximating to the *Reichswehr* of von Seeckt than to the large conscript army, predominantly infantry, on

which the military traditions of the Third Rep. rested. He favoured the concentration of armoured troops in armoured divisions, as against the general staff policy of parceling them out as army tank brigades in a supporting role, and his ideas on the tactical employment of armour were, ironically, most conclusively demonstrated by such commanders as Guderian in the Polish and Fr. campaigns of 1939 and 1940. His 2 most important military works are *Au fil de l'épée*, 1932 (Eng. trans. as *The Philosophy of Command*), and *Vers l'armée de métier*, 1934 (trans. as *The Army of the Future*). His predictions in this book were extraordinarily accurate, even to indicating the places where the Germans would break through the Fr. lines in the war that was to come. But the traditionalists, brought up on the tenets of Foch and Joffre, were against him, and none would listen to his revolutionary ideas. Besides the above he has pub. *La Discorde chez l'ennemi*, 1924, and *La France et son armée*, 1938 (trans. into Eng. 1945), and his memoirs, trans. into Eng. as *The Call to Honour*, 1940-42, 1955. See P. Barres, *Charles de Gaulle*, 1942.

Gault, the lowest div. of the upper part of the Cretaceous System (q.v.). In S. England the G. consists of stiff clay; it is overlain by the Upper Greensand which in turn is covered by the Chalk.

Gaultheria, a genus of ericaceous evergreen shrubs of over 100 species. *G. shallon* is the salal or shallon, often used in game coverts; others are grown for their flowers and berries on lime-free soils in gardens.

Gaulus, see GOZO ISLAND.

Gaunt, John of, see JOHN OF GAUNT.

Gauntlet (Fr. *gant*, a glove) was the name given to the glove forming part of the armour of knights. It consisted of a metal cuff, back of the hand, and fingers made flexible by rivets. The fingers could be covered separately by small overlapping plates, or collectively by broad horizontal plates ('mitten' G.s.). The phrase 'to throw down the gauntlet' is a synonym for issuing a challenge. 'To run the gauntlet' is a punishment where the culprit runs between 2 rows of persons, each of whom strikes him as he passes. The use of the word G. here is due to a mistaken derivation from *gallope*—Swedish *gata*, street, and *lopt*, a course.

Gaur, anct city of N. Bengal state, India, now in ruins. It is situated on the R. Bhagirathi. From 1100 until the decline of the Muslim power it was the residence of the viceroys and kings of Bengal. It is about 70 m. ESE. of Bhagalpur, and is now close to the boundary of E. Bengal, Pakistan. See G. H. Ravenshaw, *Gaur: its ruins and inscriptions*, 1878.

Gaur, see GHUR.

Gaur (*Bibos frontalis*), species of wild cattle found in most of the regions of India and Burma. The hill tribes have succeeded to a slight degree in domesticating it, but, on the whole, it is much more

frequently found in the wild state. It is almost black in colour, and has a high convex ridge between the horns. The ears are large, but the animal has no dewlap. Often the bull attains a height at the withers of 6 ft, but the back slopes very much, so that it is much lower at the loins. The animal is very shy and is usually found in large herds.

Gauss, Karl Friedrich (1777-1855), mathematician. He was b. of humble parentage at Brunswick and quickly attracted attention by his ability. In 1801 he pub. *Disquisitiones arithmeticae*, on the theory of numbers. Six years later he became director of the Göttingen observatory, an office which he retained until his death. He erected an observatory free from iron, from which he continued his researches on the subject of the magnetism of the earth, which had worldwide effects, and produced new methods for computing the orbits of planets and comets. He founded the Magnetic Association. The word 'gauss,' unit of magnetic flux density (hence 'degaussing,' in relation to the protection of ships' hulls against magnetic mines in the Second World War), is adopted from his name. His works were pub. in 11 vols., 1870-1924. See PHYSICAL UNITS.

Gautama, see BUDDHA AND BUDDHISM.

Gautier, Léon (1832-97), Fr. literary historian and palaeographer, b. Le Havre. From 1893 he was chief of the historical section of the national archives. As prof. of Palaeography at the Ecole des Chartes he furthered research into the literature of the Middle Ages. His works include *Les Epopees francaises*, 1885-8, 1878-97, and *Histoire de la poésie liturgique au moyen âge*, 1886. He also pub. an ed. of the *Chanson de Roland*, 26th ed., 1903.

Gautier, Théophile (1811-72), Fr. poet, critic, and novelist, one of the most famous personalities of the 19th cent. He was b. at Tarbes in the Pyrenees, but came to Paris while still a child, and was educ. at the Lycée Louis-le-Grand and at the Collège Charlemagne. With the intention of becoming a painter he entered de Rioult's studio, where he remained 2 years. But he was a great lover of poetry, and Sainte-Beuve had just made known to the modern world the romantic writers of the 16th cent.—the poets of the *Pléiade*. The reading of these and of the writers of the new Romantic school, especially Victor Hugo, raised G.'s enthusiasm to a high pitch. Pétrus Borel, struck with some verses he had written, introduced him to Victor Hugo, who found in G. something more than discipleship—a fervent fanaticism. Sainte-Beuve too was astonished by the work of this young writer, not yet 18, who already showed an almost unsurpassable gift of style, drawn very evidently from Marot, Ronsard, du Bellay, etc., whose tradition, abandoned by Malherbe and those who followed, he now, with the new poetic school, determined to carry triumphantly forward. He threw himself with extravagant fervour into the movement and became an extreme opponent of

the classic school. His defiance of conventionality led him even into grotesqueness of personal appearance. And indeed 'shocking the philistines' became one of his prime motives, to the detriment later of some of his work. He became one of a band of 'brigands de la pensée' calling itself 'Jeune-France.' In 1832 he produced his first long poem, *Albertus*, an extravagant theological legend remarkable for its perfection of style, its colour and imagery. Then followed *Comédie de la mort*, 1838, *Les Jeunes-France* (an attack upon the 'false romantics,' 1833), and *Mademoiselle de Maupin*, 1835, a novel which shocked public opinion by the contempt for morality displayed therein. At this point G. became a journalist and for 30 years his chief work was that of art critic and *feuilletoniste*. In *Émaux et camées*, 1852, G.'s style reaches its climax of perfection; here is seen, fully realised, that 'science of form' which was his religion. In these exquisite little poems in octosyllabic verse, the words have what he held they should always have, like precious stones, a beauty and a value all their own. It might be said of him that he did not abandon the career of a painter, but that he merely changed his tools. This feature is most pronounced in his collection *Émaux et camées*, in which everything is regarded from the point of view of the painter. 'Le style, c'est l'homme' is true of G.—his subject interested him far less than the form in which he presented it. He was not inspired by great ideas; he was an artist with a supreme love of beauty and great power of humour, irony, and charm. His theory and creed of the supreme importance of form in art at the cost both of sentiment and ideas was the side of G.'s work which inspired those who were later known as the Parnassians. If this doctrine was essentially false and harmful in its influence, G. certainly exerted a very wholesome influence on literature in liberating Romanticism from what was in danger of deteriorating into an over-subtle and morbidly introspective sentimentalism. His *Ménagerie intime*, 1869, is an informal biography, full of grace and lightness of touch, in which his favourite cats figure daintily. His other works include *Fortunio*, 1838, *Jettature*, *Une Larne au diable*, 1839, *Le Capitaine Fracasse*, 1863, *Spirite*, 1866, *Tra los Montes*, 1848, and other travels, *Histoire de l'art dramatique en France*, 6 vols. 1872, and the posthumously pub. *Histoire du romantisme*. His daughter Judith (1846-1917), who became the wife of M. Catulle Mendès, wrote novels in her name of Judith Gautier. See E. Feydeau, *T. Gautier, souvenirs intimes*, 1874; R. Jasinsky, *Les amis romantiques de T. Gautier*, 1929; H. van der Tuin, *L'Évolution psychologique, esthétique et littéraire de Théophile Gautier*, 1933; J. Tild, *Gautier et ses amis*, 1951.

Gautland, see GOTHLAND.

Gauze, light transparent fabric, used for dress purposes. The name is thought to have been derived from the fact that Gaza, in Palestine, was the place of its origin.

The warp threads of the material are crossed between each thread of the weft, which passes through a succession of loops in the warp. Thus the threads are kept apart, with no tendency to slide, and the transparent character of the fabric is maintained. Other materials have this gauze-like quality, such as muslin, etc. The manu. is extensively carried on in France and Switzerland.

Gavarni, Paul (1801-66), Fr. caricaturist. His real name was Hippolyte Guillaume Sulpice Chevalier. He was b. at Paris and became a mechanical engineer, but he abandoned this profession and became caricaturist for *Les Gens du monde* and *Le Charivari*. His work gradually assumed a more serious tone and some bitterness entered into his caricatures. He visited London in 1849, was deeply impressed by its scenes of sordidness and misery, and recorded his impressions in *L'Illustration*. He illustrated also a number of books pub. about this time, amongst which may be mentioned the works of Balzac, Sue's *Wandering Jew*, and the Fr. trans. of Hoffmann's tales. See E. and J. de Goncourt, *Gavarni, l'homme et l'œuvre*, 1873; H. France and O. Uzanne, *Daumier et Gavarni*, 1906; and study by J. Robiquet, 1932.

Gavelkind. Tenure in G., which was only met with in Kent, was a species of socage tenure dating from the earliest days of the feudal system of land holdings. Lands held in G. descended not to the eldest son but to all the sons together. G. was abolished by the Law of Property Act, 1925. See also CO-PARCENERS, and cf. BOROUGH ENGLISH.

Gaveston, Piers (d. 1312), earl of Cornwall, favourite of Edward II, son of a knight of Gascony. He was the foster brother of Edward, and was banished for his insolence by Edward I. Edward II recalled G. on his accession, and his evil influence over the king was the cause of much trouble at home. He was regent of England (1308) but was again forced to leave the country. His return was the signal for a rising by the barons, and he was captured at Scarborough by the earl of Pembroke and executed.

Gävle, or Gefle, seaport of Sweden in the län (co.) of Gävleborg on the gulf of Bothnia at the mouth of the Gefle R., 93 m. NW. of Stockholm. The tn is situated on 2 is. as well as on the riv.-banks. It has a good harbour; there is an old castle and a fine tn hall. The chief exports are iron goods, joinery, timber, and wood-pulp. It has shipbuilding yards and factories of machinery, tobacco, and cloth. Pop. 49,779. The län has an area of 7600 sq. m. Pop. 290,676.

Gavotte, name of a Fr. dance, said to be derived from the Gavots, the inhab. of the Pays de Gap. The music of the dance is in common time, beginning on the third beat of the bar. It is in 2 sections, each of which is repeated. The classical composers sometimes introduced G.s into their suites.

Gawain (Welsh *Gwalchmei*), one of the knights of the Round Table, nephew of

King Arthur and son of Lot, king of Norway and the Orkneys. About 1130 William of Malmesbury speaks of G.'s tomb in Wales and says he was king of Galloway. In Geoffrey of Monmouth's account he is a most courteous and virtuous knight, and Wace, in his trans., carries on this tradition. In Chrétien de Troyes' continuation of the Anglo-Norman tales G. is still a model of all the knightly virtues, and he is the hero of a great part of *Perceval*. In the *Tristan and Lancelot* of a later period the 'gay, gracious, and gude' knight becomes cruel, treacherous, and 'light o' love.' Malory, deriving his material from this source, and Tennyson, following Malory, present G. in this light. Some writers identify G. with the Irish hero Cuchullin (q.v.), and trace to Ireland this undeserved change of reputation, ascribing it to misconception arising out of the fact that G., whom tradition made to be a knight, 'out of faerie,' as Chaucer puts it, was the champion of women and came from that part of the anct Irish 'other world' called the 'Isle of Women.' See Jessie L. Weston, *The Legend of Sir Gawain*, 1897, 1900; J. D. Bruce, *Evolution of Arthurian Romance to 1300*, 1923-4; R. S. Loomis, *Celtic Myth and Arthurian Romance*, 1927.

Gay, Delphine, see GIRARDIN, ÉMILE DE.

Gay, John (1685-1732), dramatist and poet, b. Barnstable. Educ. at the grammar school there, he was apprenticed to a silk mercer in London, but having a strong taste for poetry and no aptitude for business, he was soon set free. Little is known of his life until 1713, except that in 1708 he pub. his first poem, *Wine*. From 1712 to 1714 he was secretary to the duchess of Monmouth. In 1713 he wrote *Rural Sports*, a georgic, which he dedicated to Pope, whose fame was by this time estab. This brought him the patronage and life-long friendship of Pope, with introduction into the company of wits associated with him: Arbuthnot, Swift, Bolingbroke, and Congreve. These friendships stood him in good stead ever after; all loved and helped the happy, simple-hearted, improvident 'good fellow' and mediocre poet who was always suffering from the 'large promise with performance scant' of aristocratic patrons. In 1714 he pub. *The Shepherd's Week*, a series of pastorals written at Pope's request to satirise the pastorals of Ambrose Philips. He also pub. the poems *The Fan*, 1714; *Trivia*, 1716, written with Swift's help; *The Wife of Bath*, 1713, an unsuccessful comedy; *The What d'ye Call It?* 1715, a dramatic skit; and *Three Hours after Marriage*, 1717, a play which was a complete failure. His *Fables*, 1727, 1738, are his best work; they are little masterpieces of their kind. But the work which made him famous was a lyrical drama, *The Beggar's Opera*, first produced by Rich in London in 1728 and afterwards performed throughout the Brit. Isles, making 'Gay rich and Rich gay' (see also LYRIC THEATRE). It is a satire on the corruptions of society. *Polly*, 1729, its sequel, was prohibited, unacted.

G. wrote sev. ballads, of which the best known is *Black-eyed Susan*. He lost all his money and spent the later years of his life in the home of the duke and duchess of Queensberry. He was buried in Westminster Abbey. The *Poetical Works* have been ed. by G. C. Faber, 1926. See lives by E. Curll, 1733; W. Coxe, 1797; L. Melville, 1921; and W. H. Irving, 1940; also W. M. Thackeray, *English Humorists of the Eighteenth Century*, 1853; and P. F. Gaye, *John Gay, His Place in the Eighteenth Century*, 1938.

Gay-Lussac, Joseph Louis (1778-1850), Fr. chemist and physicist, b. St Léonard, Haute-Vienne. In 1797 he entered the École Polytechnique, where he met Berthollet, who appointed him demonstrator to his class and assistant in the gov. works at Arcueil. In 1809 he was elected prof. of chem. at the École Polytechnique. In 1832 he was chosen prof. of general chem. at the Jardin des Plantes, Paris. He is famous for his chemical and physical investigations. In 1804 he made a balloon ascent with Biot to ascertain whether the terrestrial magnetism ceased out of contact with the earth. In a second ascent he observed the regular decrease of pressure, temp., and moisture in the air. He also affirmed that the air has the same composition at the greatest height as at the surface of the earth. In 1804 and 1805 he made experiments with Humboldt and discovered that water is composed of oxygen and hydrogen in the ratio 1 : 2. He also made a study of other gases and pub. in 1808 his *Law of Volumes*. In 1811 with Thénard he discovered that potassium could be obtained by a purely chemical process. In 1813 he pub. some valuable information about iodine, and in 1824 he discovered and investigated fulminic acid, and experimented in fermentation. He is also famous for his experiments regarding the manuf. of sulphuric acid, glass, and chloride of lime. The more important of his papers are scattered through journals, often difficult of access. The most complete list of them will be found in the catalogue of scientific papers of the Royal Society. Two of his most important works are *Recherches physico-chimiques faites sur la pile*, 1811, and *Cours de physique*, 1832. Accounts of some of his discoveries and views are to be found in J. Thomson's *History of Chemistry* (vol. ii), 1830; H. Kopp, *Entwicklung der Chemie*, 1871; J. B. Dumas, *Leçons sur la philosophie chimique*, 1878. See also P. Lenard, *Grosse Naturforscher*, 1929.

Gaya, city of Bihar state, India, 87 m. S. of Patna. G. is a great centre of Hindu pilgrimage, the particular point of interest in G. itself being the Vishnupad Temple, where the 'footprint of Vishnu' forms the Inner Sanctum.

Gayal, or *Bos frontalis*, species of ox found in the highland regions of NE. India. The animal is often found wild, but just as frequently in a semi-domesticated condition. Compared with the gaur (q.v.) it is a smaller animal, and its horns are much straighter. The forehead has no

frontal crest. The G. and the gaur frequently interbreed.

Gaza, Theodoros (*Gazes Theodoros*) (1398-1475), Byzantine humanist, b. Thessalonica. In Mantua (1442-6) he studied Lat. under Vittorino de Feltre. Was prof. of Greek (1447-9) and rector of the univ. of Ferrara; prof. of philosophy in Rome (1449-55). Trans. Gk works into Lat. (Aristotle, Theophrastus, etc.) and Lat. works into Greek (*Commentaries* by Caesar; *De senectute* by Cicero). His Gk grammar (*Grammatikē eisagōgē*, 1st ed., Aldus Manutius, 1495) was the first to include the syntaxis, and became a standard text for learning Greek: numerous eds. of and commentaries on this text were pub. until early 19th cent.

Gaza, Palestine, was the most southerly of the 5 chief cities of the Philistines. Situated about 3 m. from the sea, where the trade routes from Egypt and Petra met, G. was long an important fortress and trading tn. The prin. surviving monuments of G. are the orthodox church of St Porphyry; the great mosque—Jami' al-Kebir—also originally a Christian church and restored after the damage suffered in an earthquake (1927); the Jami' al-Sayid Hashim, containing the tomb of Hashim; and the sanctuary of Abu al-'Azam ('father of strength'), with the reputed tomb of Samson. The Tel-el-Amarna tablets mention G. for the first time, and in biblical times it was the scene of many struggles between the Israelites and the Philistines owing to the fact that through the land of Peleshet, the low-lying plain between Mt Carmel and Egypt, lay the only route practicable for armies between Egypt and Babylon. It was the Philistine tn. of which Samson carried away the gates (Judges xvi. 3). G. was famous under the Philistines for the worship of the fish-divinities Dagon and Derketo, who probably had Minoan affinities. Besides the main transit route from Egypt to Damascus an important route reached the sea at G. from the Yemen through the Hejaz; this, the frankincense route, was vital for G. because the immense demand for frankincense and myrrh could only be met in the one way, and when Alexander the Great took G. (332 bc) the booty included immense stores of frankincense in the city's warehouses. G. was then the largest city in Palestine and Syria. Although G.'s first traditional bishop was the Philémon to whom St Paul addressed the epistle of that name, paganism continued almost up to the time of the Arab conquest. In 634 G. was occupied by the caliph Omar and became important to Muslims, partly because the prophet's grandfather Hashim (a direct ancestor of the Sherifian dynasty) is buried there, partly because it is the bp. of Ibn Idris al-Shafi, the founder of the Shafi rite or school of Sunni Islam. During the crusades G. was bitterly contested between the Saracens and the crusaders, but suffered a terrible blow in 1244, when the Christians and Muslims, in alliance, were defeated by the Khwarizmians. In the 16th cent. the Mamelukes

were finally defeated here by the Turks, and in 1799 G. was taken by Bonaparte. Finally it was the scene of 2 battles (26-27 Mar. 1917) between the Brit. and the Turks in the First World War, and was very largely destroyed by the Turks and by subsequent bombardments. It was occupied by Gen. Allenby's troops on 7 Nov. 1917. Of late years the cultivation of barley has caused a partial return of prosperity. It was made an episcopal see by Constantine the Great, and has a mission with schools of the Church Missionary Society, including a hospital. Recent (1930-1) researches by the Brit. School of Egyptian Archaeology estab. that the obvious site of G. would be at the mouth of the Wady Guhzeel, the estuary of which riv. is too malarial for permanent occupation. This site, the site of Tell-el-Ajjul, is practicable only in the rainy season, beginning Jan., and, according to Flinders Petrie, was occupied from the Neolithic to the Bronze Age, and appears to have been the old G. After the age of the Shepherd Kings it was evidently abandoned like Ostia and the Gk cities of S. Italy. Pop. 45,000. *See also* GAZA STRIP.

Gaza Strip, SW. Palestine, 6 m. wide and 26 m. long, extending NE. from the Egyptian frontier. The bulk of the area is rural and is geographically part of the Negeb (q.v.). It formerly constituted an integral part of the Brit. mandated ter. of Palestine. The main centres of pop. are Gaza (q.v.), 45,000, Khan Yunis, 14,000, and Rafah, 5000. The main occupations are citriculture and date-growing. There are some handicrafts and small industry. Also within the Strip live some 200,000 Arab refugees from Israel, dependent on international relief agencies.

The Strip came into existence in consequence of the armistice agreement between Israel and Egypt of 1949, representing the area of Palestine left in Egyptian hands after the fighting of 1948. The G. S. was never annexed by Egypt, being treated as occupied ter. The Egyptian Gov. had at first hoped to make G. the centre of a Palestine Arab state. Later they maintained the separation of G. from Egypt in order to prevent the Arab refugees from moving into Egypt proper.

Between 1948 and 1956 the area was the scene of numerous incidents between Egypt and Israel. These took the form of infiltration from the Egyptian side, occasionally reaching the outskirts of Tel-Aviv, 35 m. distant, and involving murder, theft, sabotage, and mine-laying. Israel retaliated with large-scale raids and shelling. In Nov. 1956 Israel succeeded in expelling Egyptian forces from G. as well as from the Sinai peninsula. In Mar. 1957, however, as a result of repeated U.N. resolutions, Israel troops were withdrawn from Gaza in favour of the U.N. Emergency Force, and Egypt forthwith recovered the civil administration.

Gazebo, in architecture, a small open summer-house, usually placed at the end of a terrace.

Gazelle, or *Gazella*, genus of antelopes, the majority of which are inhab. of the deserts of the Old World. They have narrow upper molar teeth, like sheep, and their muzzles are covered with hair. There is frequently a gland below the eye and the tail is rather short. The horns are generally compressed and lyrate or recurved, or cylindrical and spiral with distinct rings for a considerable portion of their length. The G.s are amongst the most elegant of all antelopes and are characterised by their sandy colour and a white streak on the side of the face from the base of the horn nearly to the nose.



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GAZELLE AND YOUNG

Gazetteer. In Mod. E. this term signifies an alphabetical arrangement of place-names, in other words a geographical and topographical dictionary containing more or less abundant information, comprising statistics, descriptions, and historical details. In the 18th cent. the word was used in the sense of a writer in the gazettes or newspapers (*Fr. gazette*), and in 1703 the *Gazetteer's* or *Newman's Interpreter* was pub. by Lawrence Echard, followed in 1704 by a second part, called the *Gazetteer*. Although expressed by a new word, the idea was of ant. date, and considerable fragments of the 6th cent. geographical dictionary of Stephanus Byzantius remain to this day. Echard's method was soon adopted by other compilers, viz. Bryce, who pub. his *Grand Gazetteer* in 1759, and Crutwell, with his *Universal Gazetteer* in 1808. More modern works have now superseded these, including Longman's (*Times*), Blackie, Chambers, Lippincott, Jack, Oliver & Boyd, etc., etc. Foreign general G.s are represented by Ritter's *Geog. Statist.* *Lexikon* (1898) and *Le Nouveau Dictionnaire de géographie universelle* (Vivien de St Martin. Cassell & Mackenzie (1893) for Great Britain; Lewis, Wilson & Brabner for England and Wales; F. H. Groome for Scotland; and Lewis &

Leggatt for Ireland come under the heading of special G.s. Among foreign G.s may be mentioned Neumann for Germany, Hunter for India, Altavilla for Italy, Semenov for Russia, Rosenberg for Sweden, and Weber for Switzerland, as also a series of departmental G.s for France. In India the British Gov. bore the cost of the compilation of numerous G.s for the different states. Hunter's *Imperial Gazetteer of India* is on a magnificent scale, and remarkable for its accuracy. The individual states of the Amer. Union also have special G.s.

Gaziantep (formerly *Antep*, *Aintab*), tn of E. Turkey, cap. of the il of the same name. It contains cotton goods factories, and was the centre of Turkish resistance to Fr. occupation of Syria, 1920-1. Pop. (il) 370,808; (tn) 97,144.

Gazna, see **GHAZNI**.

Gdańsk: 1. Prov. (*województwo*) of N. Poland, bordering on the Baltic Sea. Its coastline is low, and includes the W. part of the Gulf of Danzig and the W. part of the Frisches Haff (q.v.). The prov. is mainly agric., and is drained by the lower Vistula (q.v.). It was formed in 1945 out of the dist. around the former Free City of Danzig (see 2, below), and parts of the Ger. prov. of Pomerania and the Polish prov. of Pomorze (qq.v.). It has ship-building and fishing industries. Area 4141 sq. m.; pop. 800,000.

2. (formerly *Danzig*) City of Poland, cap. of G. prov. It is a Baltic seaport on the gulf of Danzig, at the mouth of one arm of the Vistula, 170 m. NW. of Warsaw (q.v.). It once belonged to the Hanseatic League (q.v.). In 1308 it became the property of the Teutonic Knights (q.v.) and in 1466 became an autonomous Polish city. In 1793 it was incorporated in Prussia. It was made a free city by Napoleon I (q.v.), 1807-14, but then reverted to Prussia and until 1919 was the cap. of the prov. of West Prussia (q.v.). By the treaty of Versailles (q.v.) it became the cap. of the ter. of the Free City of Danzig (area 731 sq. m.; pop. 400,000). It was under a high commissioner appointed by the League of Nations, but, in order to give Poland a seaport, its railways were under Polish control and the ter. was part of Poland for customs purposes. It lost much of its former trade, however, because of the construction by the Poles of the rival port of Gdynia (q.v.). Hitler's demand for the return of Danzig to Germany was one of the main causes of the Ger. invasion of Poland in 1939 and the outbreak of the Second World War. At the end of the war, when the city became Polish, the Ger. inhab., who formerly comprised over 90 per cent of the pop., were expelled. A great part of the city had been destroyed during the war.

G. is a bishopric, and has a technical univ. It has manufs. of iron, machinery, and foodstuffs, is a transhipment point for Vistula steamers, and has an outer port at Nowy Port (formerly *Neufahrwasser*); the chief trade is in timber, cereals, coal, and iron. Pop. 340,000.

Gdingen, see Gdynia.

Gdynia (Ger. Gdingen), Baltic seaport of Poland, in Gdańsk prov., on the gulf of Danzig, 12 m. NNW. of Gdańsk (q.v.). Before the end of the First World War it was only a fishing vil. In 1921 the Poles decided to turn it into a major seaport in the Polish Corridor (q.v.), in order to end their dependence on the Free City of Danzig (see GDAŃSK). Channels were dredged, a large new breakwater was constructed, docks were built, and quays were equipped. By 1934 G. was handling more freight than Danzig, and it became Poland's chief shipbuilding centre and naval base. The authorities of Danzig tried to limit these developments, arguing that as Danzig had been created a free city in order to provide Poland with a port there remained no reason for the continued separation of Danzig from the Ger. Reich. During the Second World War the Polish pop. evacuated the city (which was renamed *Gotenhafen* by the Germans). The city was retaken by the Russians in 1945. It had suffered little damage, apart from damage to its harbour. Pop. 117,000.

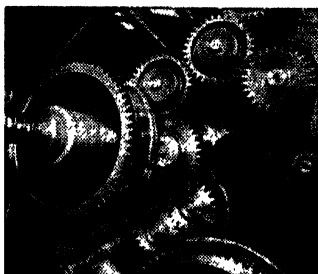
Ge, see GAEL.

Geon, see MAZZARD.

Gearing transmits energy from one part of a machine to another. It may consist of toothed wheels, belts (q.v.), friction rollers, etc. The ratio of the velocities of wheels in gear is the inverse of the ratio of their diameters. If there are more than 2 wheels in the G. the wheels between the first and the last affect the sense of rotation but not the speed of the last in relation to that of the first. Straight G., by means of spur wheels, is used when the planes of motion are parallel. When the planes are not parallel bevelled G. is used. The shape of the teeth on any wheel must be such that the friction when in gear with another wheel shall be as small as possible. The pitch (q.v.) is the circumference of the pitch circle divided by the number of teeth. When speaking of the diameter of a gear wheel, the diameter of the pitch circle is always meant.

In helical G. the pitch surfaces are cylindrical or conical, and the teeth intersect the surface in helical lines. This is a modification of tooth G., which enables the wheels to work more smoothly and greatly strengthens the teeth. For speed reducing, screw and worm G. may be used. In this the teeth of the wheel consist of portions of screw threads. The worm which drives the wheel consists of from 1 to 3 complete threads. Thus for each revolution of a worm which has only 1 thread, the wheel would move just 1 tooth forward. A special form of G., known as Houldsworth's differential G., is used in spinning-machinery for regulating the speed of bobbins. Friction G., used in lifts and other places where a rapid connection is necessary, consists of rollers or wheels which are pressed together in the direction of the line joining their centres. Pitch chain G. consists of a chain running in projections on sprocket wheels. To minimise friction

the pins forming the links are provided with rollers. Toothed wheels are usually made of brass, cast steel, or cast iron, although sometimes in high speed G. rawhide teeth are used, and occasionally wooden teeth are employed. The rollers in frictional G., on the other hand, usually have at least one with an acting surface of wood, leather, or compressed paper. Plastic gears are also used. See also MOTOR CARS; MOTOR CYCLES. See W. Unwin, *Elements of Machine Design*, 1877; Sir A. Kennedy, *Mechanics of Machinery*, 1886; C. W. MacCord, *Kinematics*, 1901; and H. E. Merritt, *Gears*, 1944.



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STRAIGHT GEARING

Geber, or Gebir, supposed author of certain works on alchemy and chem. which are written in Arabic or Lat. So little is known of him that his existence has been doubted. He has frequently been identified with Jabir ibn Hayyan, a famous Arabic alchemist who lived at Ku'fa and Bagdad in the 8th or 9th cents. His bp. has been given variously as Ku'fa, Tarsus, and Harran in Mesopotamia, and some have asserted his death to have taken place in 776. But the Lat. writings from internal evidence appear to have been written in the early part of the 13th cent., and it has therefore been denied that a man of the name of G. ever lived. It is presumed that they were written by various hands. The chief writings which go under this name are *Summa perfectionis*, *Summa collectionis complementi secretorum naturae*, and *Liber investigationis*, which were trans. into Eng. by Russell in 1678. Recent researches on the subject have led to the conclusion that the Arabic works ascribed to Jabir ibn Hayyan must have been written about a century after the time of their supposed author. They are intimately connected with the doctrines of the Isma'ite sect. The Lat. works are noteworthy as the clearest and most important of medieval chemical treatises. See E. Darmstadter, *Die Alchemie des Gebers*, 1922; and E. J. Holmyard, *The Arabic Works of Jabir ibn Hayyan*, 1923.

Gebweller, see GUEBWILLER.

Gecko, name given to all lizards belonging to the family Geckonidae of the

order Lacertilia; they are small in size, dull in colour, and the soft skin is covered with granular tubercles. Most of them have adhesive digits, which enable them to run along smooth, horizontal, or vertical surfaces with astonishing rapidity. G.s. are found in nearly all hot climates, and in Egypt and India frequently enter houses; their name indicates the sound emitted by certain species. *Phyllodactylus* is the most widely distributed genus, *P. mauritanicus* being found in S. Europe. The individuals of *Ptychozoon* are remarkable for the web-like expansions which serve them as parachutes.

Ged, William (1690-1749), inventor of stereotyping, b. Edinburgh, where he worked as a goldsmith. He patented his invention in 1725, when he entered upon a partnership with a London stationer, Jenner, and a typesetter, James, who treated him unjustly. He stereotyped 2 prayer books for Cambridge Univ. (1731) and an ed. of Sallust (1744), but his enterprise was not successful. *Consult* a narrative by his daughter and a life by Nichols, 1781.

Geddes (1879-1954), Auckland Campbell, 1st Baron, Brit. prof. of anatomy and politician, educ. at Edinburgh. Before the First World War he was prof. of anatomy at McGill Univ., Montreal. His reputation rests on his organisation, during the First World War, of a scheme of national service. In 1916 he was appointed director of recruiting, in 1917 chief of the national service ministry, in 1919 president of the board of trade. He was Unionist M.P. for Basingstoke and Andover from 1917 to 1920 and ambas. to the U.S.A., 1920-4. In 1942 he was raised to the peerage.

Geddes, Sir Eric Campbell (1875-1937), businessman and politician, b. in India; elder brother of Baron G. He was educ. at Edinburgh, and went to America to do railway engineering work. In 1906 he became general manager of the N.E. Railway Company and, in the First World War, was appointed deputy director-general of munitions and, later, director-general of military railways. He then entered Parliament, and became successively controller of the navy, First Lord of the Admiralty, and minister of transport. In the post-war Coalition Gov. he was entrusted with 'the axe' to cut departmental expenditure. In 1922 he left politics to become chairman of Dunlop Rubber Company and, later, of Imperial Airways. He was knighted in 1916.

Geddes, Jenny, Edinburgh kailwife who, on 23 July 1837, hurled her stool at the head of Laud's dean as he was going from the desk of St Giles's to read the collect for the day, in protest at the imposition on Scotland of Laud's Prayerbook. Rioting followed.

Geddes, Sir Patrick (1854-1932), scientist and sociologist. Educ. at the univs. of London, Paris, Edinburgh, and Montpellier; prof. of botany at Univ. College, Dundee. He wrote many important articles on biological and sociological subjects. His works include *Cities in*

Evolution, 1913, and, with Sir J. Arthur Thomson, *Evolution of Sex*, 1890. G. held the chair of sociology and civics at Bombay in 1919 and wrote *The Life and Work of Sir Jagadis C. Bose*, F.R.S., 1920.

Geel, tn of Belgium in the prov. of, and 27 m. E. of, the city of Antwerp. It is known as a colony for mental patients, as feeble-minded people have from earliest times been sent here to be under the control of, and employed by, the citizens. There is an infirmary for the temporary accommodation of those in need of medical assistance. The tn has a trade in dairy produce, has tanneries, breweries, and dye-works, and manufs. of woollen goods, lace, and tobacco. Pop. 24,800.

Geelong, city in co. of Grant, on Corio Bay and Barwon R., Victoria, Australia. Corio Bay has 13 wharves, where ships of large tonnage can unload, there are facilities for shipping wool and wheat to overseas markets, also large silos for bulk handling of wheat; connected by rail with all parts of the state. Industries include textile, cement, salt, rope and cordage, stoves, spirits, medicines, unbreakable glass, fertilisers, motor-cars, canneries, aerated waters, fibro-plaster, and wool scouring works. The city contains a city hall, hospitals, orphanages, churches of all denominations, free public libraries, art gallery, gov. tourist bureau, 6 colleges, textile college, technical and high schools, law courts, fire brigade stations, theatres, large wool stores, wool exchange, and large woollen mills. There are many sporting arenas—Kardinia Park Oval, main football and cricket ground, accommodates 30,000. Johnstone Park, adjoining the city hall, is beautifully laid out, and contains a memorial art gallery, bandstand, and peace memorial. Well planned botanical gardens overlook the bay and the modern shark-proof swimming enclosure and children's pool. Electric trams and also buses run to the suburbs and beach. Pop. (including suburbs) 80,000.

Geer, Louis Gerhard, see DE GEER.

Geeraardsbergen (Fr. Grammont), tn in the prov. of E. Flanders, Belgium, on the R. Dender. It has a 15th-cent. tn hall. A traditional fête called *Krakelingen en Tonnenkenbrand* (Cracknels and Bonfires) is held on the first Sunday of Lent. Pop. 10,200.

Geestemünde, see BREMERHAVEN.

Geg, see ALBANIA, *Language and Literature*.

Gegenbaur, Karl (1826-1903), Ger. comparative anatomist, b. Würzburg, where he was educ. In 1855 he was appointed prof. of zoology and comparative anatomy at Jena, but after 3 years lecturing confined himself to the latter subject. From 1873 to 1901 he held a similar post at Heidelberg. He made his reputation chiefly with *Grundriss der vergleichenden Anatomie*, 1874 (trans. into Eng. by F. Bell and E. Lankester, 1878). His pubs. include *Lehrbuch der Anatomie des Menschen*, 1883, *Vergleichende Anatomie der Wirbeltiere*, 1898-1901, *Erlebtes*

und Erstrebens, 1902, and a short autobiography, 1901. He ed. the *Mor-Jahrbuch* from 1875.

enna (Heb. *Ge Hinnom*, valley of Hinnom), deep, narrow gorge, a few m. SW. of Jerusalem, where some of the later kings of Judah offered human sacrifice to Moloch (cf. 2 Kings xvi. and xxiii; Jer. vii.). King Josiah made it the rubbish dump of Jerusalem, where the bodies of criminals also were burnt. Hence it came to be used as a symbol for hell. In the N.T. there is a clearly marked distinction between the state of the dead (R.V., 'Hades') and the place of eternal punishment (R.V., 'Gehenna').

Geibel, Emanuel von (1815-84), Ger. poet, b. Lübeck. He graduated at Bonn (1836), travelled considerably in the Grecian archipelago, and lived a quiet and studious life among literary friends in various Ger. tns. In 1843 he received a royal pension, and in 1852 was appointed prof. of aesthetics at Munich by Maximilian II. of Bavaria. G. composed 2 tragedies, *Brunhild*, 1858, and *Sophonisbe*, 1868, and a comedy, *Meister Andrea*, 1865. His fame rests chiefly on his lyric poems, which were pub. in *Gedichte*, 1840, *Juniuslieder*, 1848, *Neue Gedichte*, 1856, *Spätherbstblätter*, 1877, and *Gedichte aus dem Nachlass* (pub. posthumously), 1896. He trans. poems from Sp. and Fr. classics, in collaboration with Ernst Curtius, Paul Heyse, and others, and also wrote trans. from the Gk and Lat. poets. An ed. of his collected works appeared in 8 vols. in 1884. His correspondence with P. Heyse was ed. by E. Petzet, 1922. His biography has been written by C. Leimbach, 1894; K. T. Gaedertz, 1897; A. Kohut, 1915.

Gele Acid, see HUMUS.

Geiger, Abraham (1810-74), Jewish reformer, b. Frankfurt-on-Main. In 1832 he became a rabbi at Wiesbaden. He subsequently officiated as rabbi at Breslau (1838-63), Frankfurt (1863-70), and Berlin (1870-4). He assisted in starting the *Zeitschrift für Jüdische Theologie*, and from 1862 till his death he ed. the *Jüdische Zeitschrift*. See life by L. Geiger, 1910.

Geiger, Hans (1882-1945), Ger. physicist, b. Neustadt an der Hardt. Worked with Rutherford (1906-12) in Manchester. Made prof. of physics at Kiel (1925) and at Tübingen (1929). He is best known for his work with Rutherford (1908) and later with Mueller (1928) in the development of the Geiger-Mueller counter for the detection of atomic particles and radiation. See ALPHA-PARTICLES.

Geiger and Nuttall Relation, see ALPHA-PARTICLES.

Geiger-Mueller Counter. The G.-M. C. or Geiger-counter, invented by Rutherford and Geiger (1908) and developed by Geiger and Mueller (1928), is used for the detection and counting of fast electrically charged particles and ionising radiation. The simplest form consists of a metal cylinder (commonly about 1 in. in diameter and 2 in. long) one end of which is closed by a thin aluminium or mica window through which the particles

enter. A wire along the axis of the cylinder passes out through an insulating seal in the other end and a high potential of about 1500 volts is applied between the wire (+) and the cylinder (-). The interspace is filled with a gas, e.g. argon, at a pressure of a few mm. of mercury.

Although differing in detail, the principle is the same in all forms, and depends upon the fact that the current passed by the source of high potential through the gas is a function of the number of ions present. The passage of a charged particle produces ions in the gas—alpha particles (q.v.) from radioactive sources produce 50,000-100,000 ion pairs per cm. of air, but beta particles produce no more than a few hundred. Under the action of the high electric field near the wire these ions rapidly attain speeds sufficient to produce ions from other atoms with which they collide, and hence there is a large increase in the number of ions and the current begins to increase. This current is mainly caused by the negative ions (electrons) which move more rapidly than the heavier positive ions, and the latter form a sheath of positive space charge round the wire. This reduces the effective field and can cause the current to die away after a short time so that only a pulse of current passes. However, a multiple discharge can be caused by the impact of the positive ions on the cylinder, which leads to the production of secondary electrons. If another particle enters the counter before the first sequence is completed its pulse may be confused with that due to the first particle and the 2 pulses will not be resolved. It is necessary therefore to suppress or quench the discharge to improve the resolving power. Two methods have proved to be useful; *self-quenching*, in which the filling gas contains a few per cent of an organic vapour or halogen; and *external quenching*, in which an electronic device ensures that the initial rise of current due to a charged particle is quickly followed by a decrease in the applied voltage for a suitable period. A G.-M. counter can have a recovery time as small as 2×10^{-8} sec., i.e. it could count 5000 particles per sec. provided they arrived at regular intervals. But most radioactive disintegrations are random events and a counting rate of about 1000 per sec. is a convenient maximum; even so corrections must be made for losses due to the arrival of particles at times when the system is still recovering from the effects of a previous particle. The pulses are fed into a valve relay circuit which automatically records the number of pulses, i.e. the number of particles detected.

The size of each pulse is independent of the initial number of ions produced by the particle, therefore the G.-M. counter is unable to distinguish between alpha and beta particles, protons and gamma rays. This distinction is possible however with the *proportional counter*, which is similar to the G.-M. counter but is operated at lower voltages, 600-800 volts. In this voltage region the size of the current

pulse is proportional to the initial number of ions; it is much larger for alpha particles than for gamma rays. Electronic devices known as pulse height analysers or 'kick-sorters' enable the pulses to be sorted out and the number of each type of particle can be found, due allowance being made for the energies of the particles. *Ionisation counters* operate at yet lower voltages, 100-500 volts, and the pulse size is a direct measure of the initial number of ions as there is no amplification due to collision processes. The pulse size is therefore much smaller than that for the other 2 types of G.-M. counter and demands more sensitive recording apparatus, but it has the advantage over the proportional counter that it is not affected by small variations of the applied voltage. See CERENKOV COUNTERS; SCINTILLATION COUNTERS. See also J. Sharpe, *Nuclear Radiation Detectors*, 1955.

Geijer, Erik Gustaf (1783-1847), Swedish historian and poet, b. Ransäter, in Värmland, and educ. at Uppsala Univ. He was one of the founders of the Gothic Society (1816), and was appointed a member of the academy (1824). His poetical works, though distinguished, are now considered less important than his *History of the Swedish People*, 1832-6.

Geikie, Sir Archibald (1835-1924), geologist, b. Edinburgh; educ. at the Univ. there. He joined the Geological Survey, 1855; became director for Scotland, 1867, and in 1871 prof. of Geology at Edinburgh Univ., holding both appointments until 1882, when he was made director-general of the Geological Survey of the U.K. Knighted, 1891; O.M., 1913; F.R.S., 1865. His chief pub. are *The Story of a Boulder*, 1858, *Scenery of Scotland*, 1865, *Memoir of Sir R. Murchison*, 1875, *Text-book of Geology*, 1882, *The Ancient Volcanoes of Great Britain*, 1897, *The Founders of Geology*, 1897, *Scottish Reminiscences*, 1904, *Landscape in History*, 1905, and *Charles Darwin as Geologist*, 1909. His autobiography, *A Long Life's Work*, was pub. in 1924.

Geikie, James (1839-1915), geologist, brother of Sir Archibald G., also b. and educ. in Edinburgh. He served on the Geological Survey of Scotland from 1861 to 1882, when he succeeded his brother as Murchison prof. of geology at Edinburgh. His writings include *The Great Ice Age in its Relation to the Antiquity of Man*, 1874, *Historical Geology*, 1875, *Prehistoric Europe*, 1881, *Outlines of Geology*, 1886, and *Structural and Field Geology*, 1905. His literary sympathies are manifest in his excellent trans. of *Songs and Lyrics of Heine*, 1887.

Geller, von Kayserberg, Johannes (1445-1510), Ger. preacher, b. Schaffhausen. He studied at Freiburg and Basel. G. was a great pulpit orator and preached in Strasburg Cathedral from 1478 till his death. His chief writings are *Das Narrenschiff*, 1511, *Das Irrig Schaf*, 1510, *Christliche Püßerschaft zum Ewigen Vaterland*, 1512, and *Das Evangelienbuch*, 1515. An ed. of his *Schriften* was pub. at

Freiburg, 1877-83. See biographical studies by L. Dacheux, 1876; W. Lindemann, 1877; and E. Roeder von Diersburg, 1921. See also C. Schmidt, *Histoire littéraire de l'Alsace au quinzième siècle*, 1878.

Geisha, Jap. dancing or singing girl. The G. usually learns to dance when a child of about 7, and is contracted by her parents to a master or mistress for a period of 3 years; frequently poverty-stricken parents sell their children outright to the owners of 'geisha houses.' The G. is kindly treated and beautifully dressed by her patrons, who arrange for her public appearances at restaurants and tea-rooms, and themselves receive the profits. The dancing is mainly posturing and is without rhythm. One or more of the G.s depict a story in dance, while others play upon the *shamisen* and sing the theme of the story. But with the adoption of European forms of entertainment the institution is dying out.

Geislingen, Ger. tn in the Land of Baden-Württemberg (q.v.), on the Stelze, 32 m. SSE. of Stuttgart (q.v.). It is in mountainous country, and has a Gothic church, a castle, a ruined fortress, and old houses. There are glass and metal works, and wood- and ivory-carving. Pop. 24,000.

Geitonogamy, see ALLOGAMY.

Gela: 1. Anct Gk colony on the S. coast of Sicily, founded by Rhodians and Cretans in 690 bc. It rapidly grew in importance, and in 582 founded Acragas (Agrigento). G.'s most flourishing period was the reign of Hippocrates (d. 491 bc). He was succeeded by Gelon, who took Syracuse (485) and transported thither half the pop. of G. Aeschylus d. at G. in 456 bc. The tn was finally destroyed by the Mamertines c. 281 bc.

2. (formerly Terranova di Sicilia) Tn in Sicily (q.v.), on the S. coast, 31 m. SSE. of Caltanissetta (q.v.). It was founded in 1230 by the Emperor Frederick II (q.v.) on the site of the anct Gk colony of G. (see 1. above). It possesses a fine 18th-cent. church. There are manufs. of coarse cotton and woollen goods, tunny and sardine fisheries, and a trade in agric. produce, wine, and sulphur. Pop. 60,500.

Gelasius, name of 2 popes: *St Gelasius I* (492-6), successor of Felix III. He was a native of Africa, but the date of his birth is unknown. He was autocratic in his rule, sternly repressed Pelagianism, and removed the name of Acacius, bishop of Constantinople, from the diptychs. He succeeded in driving out the Manichaeans from Rome. On his death he was canonised, 18 Nov. being set aside in the calendar as St G.'s Day. Sev. of his letters are extant, and also a treatise on the Eutychians and Nestorians, *De duobus in Christo naturis adversus Eutychen et Nestorium. Liber Sacramentorum, et Decretum Gelasii de libris recipiendis et non recipiendis* have erroneously been ascribed to him, though he may have written parts of the former. The classical definition of the relation between Church and State was made by

G. at the end of the 5th cent. According to him, in Christian society the spiritual and temporal powers are entrusted to 2 different orders, each deriving its authority from God. Each of these powers is supreme in its own sphere, and within its own sphere is independent of the other power. Yet the 2 authorities are not completely separate. Both seek and serve the welfare of the same men and women, living in the same society. The principle is that while each is supreme in its own sphere, each is subordinate in relation to the sphere of the other. In spiritual matters the civil ruler is subject to the bishop; in temporal matters the bishop is subject to the civil ruler. See study by K. W. Grzelak, 1922.

Gelasius II (1118-9), formerly John of Gaeta. He succeeded Pascal II, but shortly after his election he was expelled from Rome by the Emperor Henry V, who set up an anti-pope, Gregory VIII (Burdinus), with the help of the Normans. G. returned to Rome in July 1118, but was soon compelled to withdraw to France, where he d. in the monastery at Cluny. See also POPES, LIST OF THE.

Gelatine, a derived protein, obtained from collagen (q.v.), prepared especially from cattle and calf skin, and from demineralised sun-dried Indian bone, by extraction with warm water, after prolonged pretreatment with a cold suspension of lime; prepared also from pigskin by extraction with a warm, very dilute acid. The most characteristic property of G. is the reversible gel-forming property of its solutions, which melt on warming and set on cooling. Both gel-forming power, and the viscosity of solutions, under standard conditions, depend on the process of manuf. The commercial products are graded. G. is used commercially and in scientific research as a protective colloid. Edible G. is used in making table jellies, prepared meat products, marshmallow, and confectionery. Other uses of G. include preparing photographic emulsions, textile sizing, paper sizing, etc. G. is the main component of animal glue (q.v.). It is manufactured in Great Britain, U.S.A., Australia, France, Belgium, Germany, U.S.S.R., and to lesser degree elsewhere. See also ADHESIVES; GLUE.

Gelderland (Guelders), prov. of the Netherlands, bounded on the SE. by Germany, on the SW. by the R. Maas, and on the NW. by the IJsselmeer, with an area of about 1939 sq. m. The chief riva. of this prov. are the Rhine, IJssel, Maas, and Waal. Agriculture is carried on, and in some parts the soil is fertile, producing wheat, fruit, and tobacco; main manufs. are cotton and paper. The prov. was originally part of the Holy Rom. Empire, but after many vicissitudes was at the beginning of the 19th cent. divided between Prussia and the Netherlands. The cap. is Arnhem, which was the scene of a great battle in 1944 between Brit. airborne troops and the Germans. For details of the fighting in the battle of Arnhem and at Nijmegen, see WESTERN

FRONT IN SECOND WORLD WAR. Pop. 1,186,465.

Gelée, or **Gellée**, Claude, see CLAUDE OF LORRAINE.

Gelibolu, see GALLIPOLI.

Gellimer (fl. 533), king of the Vandals (530-4), was the great-grandson of Genseric (q.v.). He was successful in deposing Hilderic in 530 and in obtaining the throne for himself. He was, however, defeated by Belisarius in 533 at the battle of Carthage, and gave himself up as a prisoner in 534, walking in Belisarius's triumphal procession in Constantinople the same year.

Gellert, Christian Fürchtegott (1715-69), poet, b. Hainichen in Saxony. In 1751 he became a prof. at Leipzig, where he had been educ. His works, mainly educational in aim, are important in that they broke away from the formalities of earlier writers and prepared the way for Goethe and Schiller. His writings, particularly his fables, were popular even outside his own country. He wrote a novel *Das Leben der schwedischen Gräfin von G.*, 1746, *Fabeln und Erzählungen*, 1748-51, and *Tagebuch aus dem Jahre 1761*, 1863. He was greatly esteemed for his *Betrachtungen über die Religion*, 1760, and *Moralische Vorlesungen*, 1770. His works were ed. by J. L. Klee, 1839, and F. Behrend, 1910. See Goethe, *Dichtung und Wahrheit* (vi.-viii.), 1811-22 (trans. 1897); K. May, *Das Weltbild in Gellerts Dichtung*, 1928; M. Durach, C. F. Gellert, 1938.

Gellert, traditionally Llewellyn the Great's dog, given to him by King John. Legend has it that the dog was left one day in charge of the prince's baby son and was successful in killing a wolf who came to attack him. When Llewellyn returned and saw his blood-stained dog and the baby's overturned cradle he imagined that G. had slain his child, and immediately killed the dog. He then discovered his mistake when he found the child quite safe lying under the cradle, and the body of the wolf. Versions of the same story are found in sev. countries, some of earlier date than this one, and its historical authenticity is doubtful. A tomb stands to the dog's memory at Beddgelert (q.v.) near Snowdon.

Gelligaer, urb. dist. and vil. near Cardiff, Wales. Excavations carried out in 1900-1 yielded further information on Rom. forts in Britain. Pop. (vil.) 1090; (dist.) 35,980.

Gellius, Aulus, see AULUS GELLIUS.

Gellivara, see GALLIVARE.

Gelnhausen, Ger. tn in the *Land* of Hessen (q.v.), on the Kinzig, 43 m. E. by N. of Wiesbaden (q.v.). On an is. in the riv. are the ruins of a castle built by the Emperor Frederick I (q.v.).

Gelon, tyrant of Gela and Syracuse (qq.v.). He refused help to the Greeks against Xerxes (480 BC), and in the same year gained a victory over the Carthaginians at Himera. He d. about 478 BC.

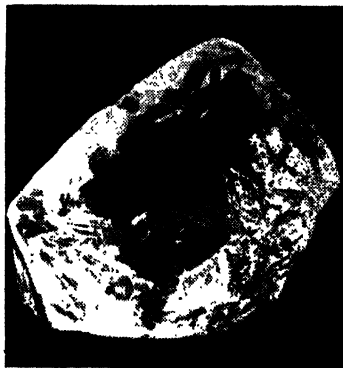
Gelsenkirchen, Ger. industrial city in the *Land* of North Rhine-Westphalia (q.v.), in the Ruhr basin (q.v.), 24 m. NE.,

of Düsseldorf. It stands on the R. Emscher and the Rhine-Herne canal. It was so repeatedly and heavily bombed during the Second World War that the Germans made efforts to transfer its industries elsewhere. The city was in ruins when it was taken by the Allies in 1945, but since then there has been much reconstruction work. The coal mines are of great importance, and there are iron and steel, glass, chemical, and textile industries. Pop. 368,000.

Gem (Lat. *gemma*, a bud, from the root *gen*, meaning 'to produce,' or precious stone). Strictly speaking, the word G. is applicable only to such hard and precious stones as have been worked by engraving; but this is in its narrowest sense, and the word is applied to precious stones that have been cut and polished as jewels, such as the diamond, emerald, ruby, sapphire, etc., and it is sometimes extended even to include the pearl. The stones of the G. engraver are almost entirely confined to the variously coloured and striped varieties of chalcedony quartz. The banded stone, usually known as onyx, is the chief material employed for cameo (q.v.) and seal engraving, and other stones important from the G.-engraver's point of view are jasper, agate, chalcedony, bloodstone, etc. The ancients, Babylonians and Egyptians seem to have first developed the art of G. engraving, and abundant remains of seals of high antiquity have come down to us. The scarabæus, or sacred beetle, was the form in which early Egyptian seals were cut, with the intaglio design engraved in a flat base; and the early Greeks and Etruscans followed this form. Gk G.s are remarkable for their exquisite sculptural beauty. An essential property of a G. stone is a high degree of hardness, so that it may stand the abrasion to which it is subjected at the hands of the jeweller in order to render it an article of personal decoration. The more precious stones, such as the diamond, ruby, emerald, etc., possess this quality, in particular the first named, which is the hardest G. in existence. These rare and more costly precious stones are seldom, if ever, treated by engraving, their high value resting on their brilliance of sparkle and colour and lustre. Most G.-stones are harder than quartz, though a few such as the opal, moonstone, and turquoise are inferior to it in hardness; but the degree of hardness of a precious stone is soon ascertained by the lapidary when cutting it.

Gravels and other deposits of a similar nature frequently contain G.-stones, where they occur as crystals, or fragments of crystals, which have been reduced in many instances to the form of pebbles. The great majority of precious stones occur in a crystallised form, which form, however, is soon destroyed in cutting. Amongst the few ornamental stones which occur without crystalline form may be mentioned opal, turquoise, and amber. Although some stones, notably diamonds, are valued for their lack of colour, in most cases the prin. element of attraction, and

the beauty of many G.s depends entirely upon their colour, which, however, is often due to the presence of pigmentary matter, and is not an essential property of the mineral. Tourmalines and sapphires, for instance, are often parti-coloured. The most common mineral pigments are probably compounds of iron, manganese, and copper. Exposure to light makes some stones change or lose their colour altogether; certain kinds of turquoise and topaz are particularly liable to do this. Artificial light also makes some stones appear to change colour, as typified in sapphires and amethysts, which frequently acquire an inky, murky tint when



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THE OULLINAN DIAMOND

Discovered in the Premier Mine, Transvaal, in 1905, it weighed 3026 carats (over 1½ lb) before cutting

displayed in artificial light. A cut stone depends largely on the amount of light reflected from its facets for brilliance, the light being reflected back or refracted from the facets at the back. The highest refractive power of any G.-stone is possessed by the diamond. The peculiar lustre and fiery flashes exhibited by this stone are due to its high refractive index and dispersion. G.-stones present variety in chemical composition. The diamond is composed of 1 element only; the ruby and sapphire are oxides; turquoise is a phosphate, and so on. In ancient times stones were held in esteem for their supposed medicinal and magical powers as much as for their beauty and rarity. For example, up to comparatively recent times the toadstone was worn for its occult power, and stones such as jade are often valued for a similar reason at the present day. Uncivilised peoples value small stones, especially those of a peculiar shape and colour, as amulets or charms. Many of the superstitions regarding stones have

come down to us, and the belief in 'lucky' stones is prevalent even nowadays.

A considerable trade has been carried on in modern times in the making of artificial G.s for jewellery purposes, and paste copies of existing G.s are manufactured with comparatively little difficulty. The rutille is the most spectacular and successful of synthetic stones. In nature it is nearly always a dark reddish brown to black, large transparent pieces being unknown. The synthetic is made in various colours and is perfectly transparent. It has great 'fire' and high refractive index, but can be identified without elaborate tests. The most famous maker of paste was James Tassie, a Scotsman, who settled in London in the latter half of the 18th cent., and was successful in copying over 15,000 of the most famous and artistic G.s of both ancient and modern times. Imitation stones are chiefly produced from a heavy glass lead of high refractive powers, and they are easily coloured by the addition of various metallic oxides.

Attempts to make diamonds artificially have been numerous within recent years. Tiny fragments produced by the Glasgow chemist, Hannay, presented to the Brit. Museum in 1880, are the only examples to survive stringent modern tests. Moissan and Crookes are also said to have experimented successfully. In 1955 the General Electric Company of America announced that they had successfully produced diamonds of industrial size and quality. The artificial diamonds manufactured have not been larger than microscopic specimens; but in lustre, crystalline form, density, and hardness they are identical with the natural stone.

Artificially made but genuine rubies and sapphires have also been put on the market. They have been obtained by heating barium fluoride with alumina, in the presence of a trace of potassium bichromate in the case of rubies, and of cobalt oxide in that of sapphires. These synthetic G.s are thus composed of the same elements as the natural rubies and sapphires, but experts in the trade can detect them readily by means of tests which would not occur to the layman, e.g. under a strong microscope round air-bubbles can be detected in the manufactured G.s, while when present in natural stones they are irregular in shape. A great many of these G.s are made to-day in France, Germany, and Czechoslovakia to meet the demand for less expensive jewellery. They were produced as early as 1904 by the Fr. chemist Verneuil in his laboratory. Artificial pearls are made by inserting an irritant in the oyster-shell, and thus 'blister pearls' are produced. The cutting and polishing of G.s is a difficult and delicate operation, and one requiring much skill on the part of the worker, especially when dealing with large stones, which may possibly be of great value. Small diamonds are often treated in what is known as 'rose' cut, that is, the upper surface is shaped to triangular facets of nearly equal size throughout.

Stones that are too thin to be cut as brilliants are often treated in this way.

See also CAMEO; JEWELLERY; and separate articles on precious stones.

See J. Woodjaks, *Book of Precious Stones*, 1909; G. F. Herbert-Smith, *Gemstones and their Distinctive Characters*, 1912, 1949; Sir A. H. Church, *Precious Stones, considered in their Scientific and Artistic Relations*, 1913; H. B. Bridgman, *Gems*, 1916; F. B. Wade, *Diamonds*, 1916; and *Text-book of Precious Stones*, 1918; G. F. H. Smith, *Gem Stones*, 1923; C. W. Cooper, *Precious Stones of the Bible*, 1924; E. H. Kraus and E. F. Holden, *Gems and Gem Materials*, 1925; H. B. Walters, *Catalogue of the Engraved Gems in the British Museum*, 1926; M. Weinstein, *Precious and Semi-Precious Stones*, 1930; R. M. Pearl, *Popular Gemology*, 1948; and B. W. Anderson, *Gem Testing*, 1951.

Gem State, see IDAHO.

Gembloux, tn in the prov. of Namur, Belgium, 24 m. SE. of Brussels. At G. Don John of Austria defeated the army under Antony de Golgnies in 1578. The tn contains the Royal Institute of Agriculture, founded in 1880. Pop. 5600.

Gemina Urbanorum, see OSUNA.

Gemini, or the Twins, constellation and third sign of the zodiac (q.v.). The sun enters the sign of this constellation at or about 21 May. It derives its name from 2 bright stars in close proximity, α Geminorum of second magnitude and β Geminorum of the first magnitude—in this case the order of alphabetical arrangement is reversed, α being usually the brightest star. They were known from the time of classical antiquity as Castor (q.v.) and Pollux. The feet of the Twins are crossed by the Milky Way. Near G. is a cluster, M. 35, which looks like a nebula to the naked eye. See CASTOR.

Geminiani, Francesco (1687–1762), It. violinist and composer, b. Lucca. He studied music under Alessandro Scarlatti and Corelli, following the latter very closely. In 1714 he visited England, where he very quickly became famous and decided to settle. A few years later he went to Dublin, where he d., after dividing his time between England and Ireland. He is the composer of many concertos and sonatas, and the author of excellent theoretical works.

Gemmi Pass crosses the Alps in Switzerland. It rises to a height of 7641 ft. and connects the canton of Valais with that of Bern. Near it, on either side, are the little tns Leukerbad and Kandersteg, both health resorts.

Gemsbok, or *Oryx gasella*, species of antelope which inhabits the desert regions of SW. Africa. It stands about 4 ft in height, and its general colour is greyish. The horns of the male animal measure 42 in. in length, while those of the female may reach 46 or 47 in.

Gendarmes, originally a cavalry regiment of France, and up to the time of Louis XVI served as the king's bodyguard. After the Fr. Revolution their functions were necessarily altered, and

they are now a military police, consisting of infantry and cavalry. They are a part of the army, although they are better paid than the rest of the army, and may be called out on active service if needed. They have various duties, among them those of policemen. In Palestine, after the First World War, the Brit. Gov. organised a Jewish and an Arab gendarmerie to keep the peace.

In mountaineering parlance, G. are the formidable isolated vertical obstacles that occur at intervals on every difficult ridge climb.

Gender, distinction made in grammar between words to indicate a difference of sex in the objects denoted by these words. As a general rule in the Eng. language this grammatical distinction agrees with the natural distinction known as sex. Thus names denoting the male sex are masculine G., those denoting the female sex feminine G., and those denoting inanimate objects are neuter G., that is, neither masculine nor feminine. These are cases of natural G., that is to say, the sex and G. agree. This rule is departed from, however, sometimes when inanimate things are personified, as when a ship or engine is made feminine, and the sun and time are made masculine. These are cases of grammatical G., sex and G. being different. In O.E., and also in Lat., German, and Greek, this grammatical G. is much more common, many inanimate objects being either masculine or feminine G., while in modern Fr. and other romance languages the neuter G. does not exist.

Gene, the theoretical unit of heredity (q.v.), as first demonstrated by J. G. Mendel's experiments in the breeding of plants, 1865. See also **GENETICS**. See T. H. Morgan, *Theory of the Gene*, 1926.

Genealogy, science by means of which the descent or pedigree of a family may be ascertained. Though perhaps hardly of sufficient importance to rank as an independent science, it forms a very important part of hist., and there is a growing interest shown in matters pertaining to genealogical research. G. has formed the basis of all true hist. from the earliest times, and many of the old G.s have arisen from the desire to explain the origin of the various groups included in them. The first GK records were those of ancestry, and a wide scope for G. was afforded by the progress of civilisation in states, and, more particularly, by the institution of corporations and guilds in towns. In modern times the laws of inheritance and the desire to assert the privileges of an hereditary aristocracy have combined to give G. its importance; more especially those laws of inheritance governing the descent of real estate. It was long, however, before G.s were found in the possession of private families, and scarcely one, no matter how distinguished, can trace ancestors even to the middle of the 11th cent. Only after the close of the Middle Ages did G.s multiply in men's houses and become collected in vols., but from the 16th cent. onwards they are found in plenty in MSS. and printed vols.

Antiquaries have, for some centuries, made G. a favourite study, and their researches have been of the utmost value to the historian and biographer. A host of works are occupied with the G. of Eng. noble families, at the head of which stand Dugdale's great works on the Eng. language. Genealogical research has made great advance during the last generation, and its study at the present time is growing rapidly, not only in England but in the U.S.A. and, to a certain extent, in Germany. Much genealogical material has become available by the pub. of par. registers, marriage licence allegations, and such-like; and particularly the mass of evidence contained in the vols. issued by the Public Record Office. The records of the College of Heralds form, perhaps, the greatest genealogical collection in the world; but they are not open to public inspection. See H. F. Waters, *Genealogical Gleanings*, 1901; D. G. Jordan and S. J. Kimball, *Your Family Tree*, 1929; J. H. Round, *Family Origins*, 1930.

Genée, **Dame Adeline (Genée-Isitt)** (1878-), Dan. ballerina, b. Aarhus, Jutland. A pupil of M. and Mme Alexandre Genée, she came to England in 1897. She was the prin. ballerina at the Empire Theatre, London, 1897-1907, 1908-9, and later danced at the Coliseum and the Alhambra, retiring as a dancer in 1917. She also danced in Berlin, Copenhagen, and New York. She continued to play a leading part in Eng. ballet, being concerned in the foundation of the Camargo Society in 1930, and being the first president of the Association of Operatic Dancing of Great Britain (later Royal Academy of Dancing) from 1920 until 1954. Created D.B.E., 1950.

General: 1. Title of an officer in the Brit. Army who holds the rank next below a field-marshal. There are 2 other ranks bearing the title G., lieutenant-general and major-general, both of which are ranks below G. In some other armies there are 2 other ranks of this character, colonel-general and brigadier-general.

2. In the Rom. Catholic Church the title is popularly given to the head of certain religious orders under the Pope. To the G. all the members of the order and all the officials are responsible, and he holds office as a rule for 3 years, though in the case of the Jesuits it is for life. The G. is responsible only to the Pope himself, and is accorded certain privileges in Rome, where he usually resides.

3. The highest official of the Salvation Army (q.v.).

General Agreement on Tariffs and Trade (G.A.T.T.), the product of Clause 4 of the Atlantic Charter, 1941, Article 7 of the Mutual Aid or Lend-Lease Agreement, 1942, Article 23 of the Hot Springs Resolutions, 1943, the U.K.-U.S. Loan Agreement, 1945, and the I.T.O. (International Trade Organisation); estab. to liberalise international trends by reducing tariffs and clearing away quantitative restrictions on trade. It has a small secretariat which organises and documents conferences of the 23 member

nations. The first 3 conferences (Geneva, 1947, Annecy, 1949, Torquay, 1951) estab. some 60,000 tariff rates associate with about three-fifths of world trade. Such 'bindings' were to last until 1958, when most were expected to be renewed or extended. At the 1947 Geneva congress the U.K. reduced duties on 260 articles and restored free imports of gas mantle ash and silica refractory bricks. At Torquay U.K. specialities were tariff cuts on hazel nuts not in shell, dried figs, 15 dental instruments, hair-clippers, razor-blades, accordions and concertinas, white pastels, white chalks, and white crayons. U.S.A. tariff rates of 1945, if applied to the 1952 pattern of trade, would have averaged 17.9 per cent; 1953 rates would have averaged 12.2 per cent. This reduction illustrates the partial success of G.A.T.T. A notable example is wool cloth, on which the U.S.A. import duty, formerly 50 cents per lb. plus 45 per cent *ad valorem*, was by 1956 37½ cents per lb. plus 25 per cent *ad valorem*. On Scotch whisky the U.S.A. pre-war duty was \$2.50 per proof gallon, and in 1956 \$1.50.

G.A.T.T. declared that subsidies on exports of manufactured goods should cease by the end of 1957. As regards controversies over protection for 'infant industries' in under-developed communities (which infants, Free Traders argue, never grow up), G.A.T.T. confines itself to consultations at 2-yearly intervals. G.A.T.T. furnishes a forum and a medium for settlement through the good offices of disinterested member-nations. The percentage of world trade accounted for by commerce within and among the industrial areas of the world rose from 34 in 1950 to 40 in 1954. Economists believe that changes of this order in the pattern of the trade in which G.A.T.T. functions reinforce the case for further liberalisation, which makes for rising living standards and political pacification. See FREE TRADE: PROTECTION.

General Assembly, highest ecclcs. court in the Presbyterian Church of Scotland, Ireland, and the U.S.A. In the G. A. of the Estab. Church of Scotland sit representatives from each presbytery. This assembly meets every year in May, and sits for about 10 days. It contains both laymen (elders) and clergymen, and has judicial and legislative power, and cases brought from lower courts are settled in this one. It is also connected with the State, as a lord high commissioner always attends to represent the queen. In the other Presbyterian churches the G. A.s are very similar, the only difference being in their constitution and in certain unimportant particulars.

General Paralysis of the Insane, syphilitic degeneration of the brain. It is a late manifestation of an untreated syphilitic infection in early life, usually coming on in from 5 to 20 years after. Fortunately, owing to the well-organised facilities for the diagnosis and treatment of venereal disease, and to the specific action of penicillin on the spirochaete

of syphilis, G. P. I. is now becoming uncommon in this country. It is characterised by a progressive deterioration of mental and physical powers. It most often starts in middle life and the mental symptoms are usually noticed first. They take the form of delusions, particularly delusions of grandeur. The patient may make extravagant claims of wealth and social position. There is increasing loss of muscular power, with inco-ordination of movement and loss of balance. The patient cannot stand with his eyes shut or in the dark. The pupils cease to contract in the light and the reflexes generally are diminished or abolished. The disease is slowly progressive and the patient eventually becomes bedridden. Anti-syphilitic treatment will arrest the progress of the disease but will not repair any damage already done. A form of juvenile G. P. I. may occur from an inherited syphilitic infection. See under SYPHILIS and INSANITY.

General Staff, body of military officers (with their staff) responsible for the organisation and training of an army, together with its operations and intelligence activities. To-day the G. S. is a part of an army H.Q., working in conjunction with the adjutant-general's branch and the quartermaster-general's branch. The 3 parts of what is generally referred to as 'the staff' are colloquially known as 'G., A., and Q.' See Maj. R. G. Jessel, *G., A., and Q.*, 1947; Lieut.-Col. J. D. Hittle, *The Military Staff*, 1949. See also STAFF, MILITARY.

General Steam Navigation Company Ltd., shipping line which owes its origin to a group of steam packets which in 1820 plied between London and Margate. The company was founded under its present name in 1824. In 1842, when steamships had been greatly improved, Queen Victoria journeyed in the G. S. N. C. vessel *Trident* from Scotland to London. In 1902 the company became a limited liability company, and in 1909 it occupied the offices at 15 Trinity Square, London, where it is housed to-day. Between the 2 world wars offices were reopened or estab. in Germany, Holland, Belgium, France, and Italy. During the 2 world wars nearly all the company's vessels were engaged on war services, and many were lost. To-day the company maintains regular cargo services between the U.K. and most of the near continental ports, and also to the Mediterranean. It also operates, during the summer months, the well-known 'Eagle Steamers' which carry out day excursions from Tower Pier to Southend, Margate, Ramsgate, Clacton, etc. The company is part of the P. & O. group. In 1949 the company owned about 50 sea-going vessels, with a total gross registered tonnage of about 50,000 tons. See L. Cope Cornford, *Century of Sea Trading, 1824-1924*, pub. on the occasion of the centenary of the company, 1924.

General Strike (1926), see STRIKE.

Generalisation, term denoting the inclusion or grouping under one general

head of a number of individual objects or persons, ignoring all incidental differences and minor qualities and considering them solely from the point of view of their common characteristics. The genus is a higher class including the lower class or species. Hence it follows that the wider a G. is the less specific it becomes.

Generalissimo, title given to a man who is commander-in-chief of sev. armies, or of sev. divs. of one army acting separately.

Generations, Alternation of, *see* ALTERNATION OF GENERATIONS.

Generators, *see* ELECTRIC MACHINES.

Gènes, *see* GENOA.

Genesis (Heb. *Bereshith*, 'in the beginning'), first book of the Pentateuch (q.v.), containing the earliest traditions of the Hebrews as to the origin of the world and of man, his fall, his cultural development and moral and spiritual decay, and of the intervention of God to prepare a people for himself through whom all the nations of the world should be blessed. So the story passes into the record of the Heb. patriarchs, from Abraham to Joseph, and ends with the sojourn of the Children of Israel (Jacob) in Egypt. The material used in the book must originally have come from oral tradition, though written sources are now known to be possible. The substantial Mosaic origin of the Pentateuchal tradition is regarded by the best authorities as certain. The historicity of the patriarchal narratives in G. seems to have been estab. by our increasing knowledge of ant. times. The early chapters are in a category by themselves, as they purport to describe events that happened (as modern physical and palaeontological science tells us) hundreds of thousands of years before the patriarchs. They are not hist. in the strict sense of the word. Whatever primitive lore lies behind them, however, they cannot be equated with the similar legends of Babylonia, nor is there any direct literary connection between them, as used to be thought. The contrasts are as striking as the coincidences, illuminating as the latter may be, and not least is the contrast in moral and theological depth, in which the Heb. stories have a unique quality that can only adequately be explained by inspiration.

Genet, Jeanne Louise Henriette, *see* CAMPAN.

Genet, *see* GENETTE.

Genetics is concerned with the origin of individuals, varieties, and species, and with the causes of similarities and differences between individuals and their ancestors. The term G. was suggested in 1906 by Bateson, who did much to establish and forward the study of the science by his careful observations and experimental work in connection with the breeding of plants and animals (*see* BREEDING AND BOTANY).

G. is intimately connected with the study of heredity (*see* HEREDITY AND BIOLOGY) and with cytology (*see* CELL), for its great problems are those of the ways in which offspring inherit certain characteristics and yet at the same time have in-

dividual differences. How these arise, how resemblances are contained in the egg, manifest themselves at various stages during development, and are again passed on to generations of descendants, are problems for the geneticist to solve. The elucidation of certain problems arising in the study of groups of individuals has been made possible by biometric methods. The science of G., which owes much to T. H. Morgan and his collaborators, reached its culmination in 1934, when the cytologist, Painter, of the univ. of Texas, proved by ocular demonstration that the genes are in fact arranged in lineal order along string-like chromosomes, as had long been surmised by geneticists on theoretical grounds as a result of their experiments in hybridisation. The manner in which the genes are passed on by the chromosomes is complex, but our understanding of it is remarkably accurate and complete. The main facts—the Mendelian 'ratios' (*see* MENDEL and MENDELISM), or proportions in which various kinds of offspring are produced, in all their complex variety—are as firmly based as any of the facts of biology. Results of research in G. have been successfully applied to eugenics, to scientific breeding, and to the study of evolution. It may be mentioned here that the study of G. (as the word is understood in the W. world) was recently forbidden throughout the Soviet Union, because one Lysenko denied the validity of the whole of G. and of the chromosome theory of heredity. In the early days of the Soviet regime G. was pursued as a matter of course, but later the authorities explained to scientists that it was not their function to investigate, but solely to serve the material wants of mankind. This meant that scientific research would eventually be directed by politicians through their chosen scientists, one of whom was Lysenko. Lysenko, partly by reintroducing some old agric. practices as if they were his own discoveries and by using the language of dialectical materialism, so imposed upon the Soviet authorities that finally they handed over the control of biological research to him—despite his dismissal of the science of G. It remains to be seen if, with his subsequent fall from grace (1954), the study of G. will again be permitted there.

See W. Bateson, *Problems of Genetics*, 1913; C. H. Waddington, *An Introduction to Modern Genetics*, 1939; H. Kalmus, *Genetics*, 1948; H. Riley, *Genetics and Cytogenetics*, 1948; T. Dobzhansky, *Genetics and the Origin of Species*, 1951.

Genette (Arabic *jarnail*), or **Genet**, name given to a genus of carnivorous mammals belonging to the Viverridae; they are allied to the civet, but differ in being smaller and in the comparative faintness of their musk-like odour. Their fur is soft and often beautifully marked, the general colour being grey. They range over the S. of Europe, Syria, and Africa. *Genetta genetta*, the common G., runs wild in France and Spain, and is sometimes domesticated and trained to kill rats and mice.

Geneva (spirit), *see* HOLLANDS.

Geneva (Fr. *Genève*; Ger. *Genf*): 1. Canton in the SW. of Switzerland, bounded by the lake of the same name, the canton of Vaud, and France. The Rhône and numerous mt streams water the country, which is hilly; but the soil had been made fertile by persistent cultivation. The chief industries are fruit-growing and the manuf. of articles of jewellery and clocks and watches. G. was admitted into the Swiss Confederation in 1815. Area 109 sq. m.; pop. (1955) 218,800.

2. City in Switzerland, cap. of the canton of the same name. It is of great antiquity and is mentioned in Caesar's *Commentaries*. It acknowledged Rom. supremacy in 120 BC. In 466 it came

streets were narrow and ill drained; but after that year the town was entirely rebuilt in modern style. Its monuments are of no very great magnificence, though it has some antique and picturesque buildings, and a fine statue of Rousseau is erected in its public pleasure-grounds. It is also beautifully situated, the course of the Rhône through the town forming 2 small is. The prin. edifices are the 12th-cent. cathedral of St Peter, the academy founded by Calvin and now converted into a univ., the fine theatre, ranking next in size to the Paris Opera House, the Athenaeum, and sev. museums, notably the Museum of Natural Hist., containing De Saussure's geological collections. An institute of higher international studies was founded in 1927. G. was chosen as



Swiss Federal Railways

GENEVA, WITH ROUSSEAU ISLAND

The snow-covered peak on the left is Mont Blanc

under the Burgundian sway, and was incorporated with the kingdom of the Franks in 534. G. is one of the most conspicuous places in Europe, owing to the celebrated part it has played in European civilisation as the centre of Calvinism. Calvin went to G. in the year 1536, and by his work there made it one of the chief religious centres throughout Europe. It was then the leading city of Protestantism, and a refuge for the persecuted from Italy, England, and France, thus acquiring a cosmopolitan character. During the Fr. Revolution G. was annexed (1798) to France, but on the fall of Napoleon it regained its liberty, and in 1815 joined the Swiss Confederation. Since the end of the 18th cent. it has become the centre of a remarkable scientific activity. It is famous as having given birth to Rousseau, De Saussure, De Luc, and many other celebrated men, and its educational institutions and scientific collections are deservedly noted. Among G.'s famous residents were Voltaire, Gibbon, Shelley, Ruskin, Byron, and Necker. Prior to 1847 G. was surrounded by walls, and its

the seat of the League of Nations, for which a magnificent new palace was built, following the choice of designs, after an international competition held in 1927. The main block is in Ariana Park, on the heights above Pregny. G. is also the seat of the International Red Cross (*see* GENEVA CONVENTION). Its chief industry is the manuf. of watches, clocks, jewellery, scientific instruments, and musical boxes. Pop. (1955) 158,800, Fr.-speaking.

3. The lake of G. is situated between Switzerland and France, the larger portion belonging to the former country. It is in the form of a crescent and is 45 m. long and 8 m. broad, its total area being 225 sq. m. At certain periods of the year the surface of the lake is subject to sudden rises and falls, probably due to differences of barometric pressure on different parts. These phenomena are known as *seiches*. Mirages are also at times observed on the lake. The S. Fr. shore has the Savoy Mts in the background, and is of a solemn and stern character, while the shore on the N. side of the Pays de Vaud has become quite a classic spot on account of its

association with men of note. J. J. Rousseau mentions it in his *Nouvelle Héloïse*, and Byron in *Childe Harold* and *The Prisoner of Chillon*. Mont Blanc, though 60 m. distant, is visible from the lake. At the upper end of the lake the Rhône enters it, turbid and yellow, but at the top of G. leaves it limpid and azure-tinted. Lake dwellings have been built on its shores in prehistoric times, piles of which can still be seen near G. There are many historical resorts which attract both tourists and winter residents—Vevey, Montreux, Coppet, Féreny, etc. A railway runs along its N. and S. shores. In the harbour of G. are 2 great granite rocks, named Pierres du Niton, which project above the water, and are known as Neptune's Altars.

4. City of Ontario co., New York, U.S.A., situated at the N. end of Lake Seneca. It is the seat of the State Agric. Experiment Station and of the Colleges of the Seneca (Hobart College (Protestant Episcopal) and William Smith College). G. was settled about 1788 near the site of an Indian vil., and chartered in 1898. There are large nurseries, and manufs. of motors, engines, optical instruments, canned goods, etc. Pop. 17,140.

Geneva Conferences: 1. Held by the foreign ministers of 19 countries at Geneva, April–July 1954, to discuss (a) the unification of Korea, and (b) a settlement in Indo-China. The Chinese People's Rep. was represented at the conference by Chou En-lai, but the Amer. secretary of state did not negotiate with him, leaving the conference early in May. No settlement was reached in Korea; but an armistice ending the Indo-China war was signed on 21 July. Viet-Nam was partitioned into Communist and non-Communist states, and it was proposed that free elections to determine a final settlement should be held in 1955, but this last arrangement has not been (1957) carried out.

2. The heads of gov. of Britain, France, Russia, and the U.S.A. met at Geneva 18–23 July 1955, the first such meeting since Potsdam (1945). At the end of their talks future negotiations were proposed between their respective foreign ministers on subjects including Ger. unification, disarmament, and E.-W. contacts. The 4 foreign ministers subsequently met at Geneva 27 Oct.–16 Nov., but no agreement was reached on any of the topics discussed.

Geneva Conferences (Naval Disarmament): 1. Conference of 1927, the sequel to the Washington Conference of 1922 (q.v.). Like the latter it was initiated by the U.S.A. It met at Geneva in 1927 for the purpose of closing the gap left by the Washington Treaty, which dealt only with capital ships and aircraft carriers. The problem of cruisers, destroyers, and submarines, however, remained unsolved. Furthermore, the prospects of the Geneva Conference were clouded at the outset by the refusal of France and Italy to send delegates on the ground that naval disarmament could not be discussed in

isolation. Great Britain and the U.S.A. found themselves divided by an unbridgeable gulf: parity in tonnage, which was accepted by both, was not necessarily parity in fighting strength, and on this difference the conference broke down. Its sequel was the London Conference in 1930 (q.v.).

2. Conference of 1932. After the London Conference of 1930 Britain and the U.S.A., both of whom had reduced their land forces to little more than token size, were concerned to find some way of reducing the world burden of armaments, and the unrest to which it gave rise. The chief impediment was France's unwillingness to reduce her armies without full guarantees of security; and the question was by this time further complicated by Germany's growing insistence on equality of rights in the matter of armaments. These were the factors which wrecked the Disarmament Conference that opened at Geneva in 1932. At this conference Britain and America advocated the restriction or elimination of offensive weapons, but could not agree as to what weapons came under that description. The conference was given its death-blow in Oct. 1933 when Hitler announced Germany's withdrawal not only from the conference but from the League of Nations as well. See *Disarmament: a Review of the Acts of the League of Nations and of Governments, of Deliberation and the Trend of Public Opinion and Action relating to the World Disarmament Conference of 1932* (Disarmament Committee, Geneva), 1932.

Geneva Convention. This convention or treaty was originally adopted at a national conference held at Geneva, Switzerland, in 1864, but was afterwards replaced by the convention of 6 July 1906, also adopted at Geneva. It was an international agreement, chiefly respecting the succour of the wounded in time of war, and it forbade all cruel methods of warfare. In 1870–1, during the Franco-Ger. war, a Red Cross Society was formed which did most valuable work, the Geneva cross flag, adapted from the insignia of the old military Order of St John, being recognised as neutral. International conferences promoting the same objects were also held at Paris and Berlin. The adoption of the new G. C. of July 1906 resulted in a new ed. being adopted at the Peace Conference of 1907. A further convention was made in 1929, dealing especially with the treatment of prisoners of war and civilians in the light of the experiences of the First World War, and there have been further amendments since. In 1949 a new convention was signed, after preliminary talks in 1946, incorporating amendments suggested by the experiences of the Second World War.

Geneva Protocol (1924), or protocol for pacific settlement of international disputes, represented an attempt by the League of Nations to find a solution of the ambiguities and vagueness of the Covenant of the League (see COVENANT OF THE LEAGUE OF NATIONS). It was adopted

by the fifth assembly of the League, and though it was rejected by the govts. concerned, it is of historical importance in that it reveals in clear relief the salient problems concerning Europe in the post-war period. In the protocol the League sought to tighten up the sanctions (i.e. penalties) against aggressive wars, and also to increase the number of occasions on which those sanctions should become applicable; and these reforms involved a determined attack on the problem of disarmament. But the Brit. representatives at the Council of the League would agree to nothing which should compel them to state in advance their country's quota contributions to the military, naval, and air forces (necessary to ensure the fulfilment of the obligations of the Covenant), nor surrender the right to determine for themselves those contributions. Thus, though the protocol added nothing to the legal sanctions (of Article 16 of the Covenant), it raised the moral obligations imposed on League members. In its next aspect the protocol, in a proposed amendment of Article 12 of the Covenant, ruled out absolutely the legality of war except when the nation in question was, in self-defence, resisting an act of aggression, or when it was acting on behalf of the League against a recalcitrant state. The test of aggression in the protocol was the refusal to submit a dispute to the procedure of pacific settlement provided by Articles 13 and 16 of the Covenant as amplified by the protocol, or, in other words, a party to a dispute would not only have to refer to one or another form of arbitration, but be compelled to comply with the judicial sentence or arbitral award which resulted therefrom. From the Brit. point of view, however, the fundamental weakness of the protocol was that the Brit. Parliament was asked, in effect, to surrender to what might be a group of unknown men in no way responsible to it those powers of peace and war which it had claimed to exercise for centuries, and that is why Great Britain refused to ratify the protocol. See D. Hunter Miller, *The Geneva Protocol*, 1925; G. Butler, *A Handbook of the League of Nations*, 1925; and P. J. N. Baker, *The Geneva Protocol for the Pacific Settlement of International Disputes*, 1925.

Geneviève, or Genoveta, St. c. 422-c. 500), patron of Paris. According to tradition she was b. at Nanterre, then went to Paris, where she became famous for her benevolence and for her predictions of the future. She encouraged the citizens to defend their city against the Franks and the Huns. Her feast is on 3 Jan., and relics connected with her are preserved at the church of St Etienne du Mont. The great frescoes of Puvion de Chavannes in the Pantheon in Paris illustrate her life.

Geneviève of Brabant, heroine of medieval legend. Said to have been the wife of the palatine Siegfried, she was falsely accused of adultery and condemned to death, the punishment being commuted to exposure in a forest. The story goes that she wandered Diana-wise for some years

when she was found by Siegfried during one of his hunting expeditions, and her innocence acknowledged. There is no historical basis for the legend.

Genghis, or Jenghiz, Khan (1162-1227), Mongol emperor; the son of Yesukai, his mother's name being Yulun. He was b. by the R. Onun, and was only 13 when his father d. His name was Temuohin, which he changed in 1206 to Jenghiz, in Chinese 'Ch'eng Ch'i-ssu'. His victory over the Naiman Mongols left him undisputed ruler in Mongolia, and after crushing the Merkit Khan on the R. Irtysh he moved towards N. China, then occupied by the Chin Tatars. By 1213 3 of his armies were sweeping from victory to victory, wiping out cities till the whole country N. of the Yellow R. was in his hands, except Yenking (Peking). G. moved back to the W. and crushed the Khitanes and the Shah of Khwarizm (Khiva), whose ter. on the Oxus was the key to the Caspian and so to Europe. G. or his sons then in turn conquered Bokhara, Samarkand, and Merv, sacking and destroying the tns and putting all the inhab. to death. His powerful rival, Mohammed of Khwarizm, d., and G. pursued his son, Jeleleddin, to Herat and thence to India. Meanwhile other armies had invaded Russia with the same astonishing success, and when G. d., in 1227, on a journey in Mongolia his empire stretched from the Yellow Sea to the Dnieper. G.'s tomb is now in Huhsot, Inner Mongolia, China. See Sir R. K. Douglas, *Life of Jenghis Khan*, 1877; H. Lamb, *Genghis Khan, the Emperor of all Men*, 1933; R. Fox, *Genghis Khan*, 1937; and V. G. Yan, *Jenghis Khan*, 1942, trans. 1945.

Genie (dgrinn), see GENIUS.

Genii, see JINN.

Genista, genus of hardy leguminous shrubs found in the old world and represented in Britain by 3 species. *G. tinctoria*, the dyer's green-weed, found in Brit. fields, pastures, and thickets, is noted for the yellow colour obtained from its flowers and used in dyeing wool. The seeds act as a mild purgative. *G. pilosa* is rare and local. *G. anglica*, a spinous plant, is common in England and Scotland. Altogether at least 70 species are known. *G. virgata* and *G. cinerea* are tall brooms growing up to 12 ft high with small pointed leaves, silvery underneath, covering themselves with cascades of fragrant little pea-flowers of brilliant yellow in late June and early July. The chief difference is that the first-named flowers a little earlier. *G. dalmatica*, Dalmatian broom, *G. delphinensis*, *G. januensis*, *G. sagittalis*, and *G. villarsii* are dwarf forms from S. Europe. *G. radiata* and *G. hispanica*, Sp. gorse, are useful garden shrubs.

Genius. The Romans believed that every man at birth is endowed with a special guarding spirit, influencing his character and deciding his good or ill fortune, happiness or misery. As it presides over the generating principle (*genius*, root *gen-*, *gignere*, to beget), the

G. is masculine; women looked to Juno (q.v.), in childbirth to Juno Lucina. Though not a household god, offerings were made to the G. of the father of the family (*paterfamilias*), and the marriage bed is named *genialis*, dedicated to G. A Rom. swore by his G. The Gk *daemon* is parallel, but the idea of evil or good *daemones* was purely Greek, and the G. purely Rom., or, rather, Italian. When Rom. religion, influenced by the pantheon of the Greeks, began to take a more anthropomorphic view of the various deities, they, too, had *genit* designed to them, and so too did cities, trades, and guilds, and especially the nation itself; there was a *genius publicus populi Romani* as well as a *genius urbis*, i.e. of Rome. The G. of the emperors was publicly worshipped. Eng. has taken the word 'genil,' altered to 'genie,' as a trans., usefully representing the pronunciation of the Arabic *djinn* or *jinn*, the beneficent or maleficent spirits of Arab mythology.

Genk, tn in the prov. of Limbourg, Belgium, 8 m. ENE. of Hasselt. There are important coal-mines at the hamlets Waterschee, Zwartberg, and Winterslag. In 1920 the first coal of the Kempen (Campine) basin was mined here. Brewing and the manuf. of fibre are carried on. Asparagus is largely cultivated in its sandy soil. Pop. (1955) 42,800.

Genlis, Stéphanie Félicité, Comtesse de (1746-1830). Fr. writer, b. Champcéry, near Autun. In 1770 she became lady-in-waiting to the duchess of Chartres, and was made governess to her daughters; in 1781 the duke appointed her as tutor (*gouverneur*) to his sons, and she carried on their education until 1793, when she had to leave France. After the Restoration she wrote in defence of monarchy and of religion. When she was past 80 years of age she wrote her memoirs. She lived to see the events of July 1830, and her former pupil, Louis-Philippe, raised to the throne. Her methods of education seem to have been considerably in advance of her time, and we hear of her illustrating her hist. lessons by magic-lantern slides, and teaching botany while out for walks. Her works are numerous and of some historical value; they include *Théâtre de l'éducation*, 1779-80, *Adèle et Théodore* (comedies for children), 1782, *Mémoires inédits sur le dix-huitième siècle*, 1825, and a romance entitled *Mademoiselle de Clermont*, 1802. See G. Maugras, *L'Idylle d'un gouverneur*, 1904; W. M. Kerby, *The Educational Ideas and Activities of Mme la Comtesse de Genlis*, 1926; J. Bertaut, *Mme de Genlis*, 1941.

Gennadius II, or **George the Scholar** (c. 1400-70), an Aristotelian and writer, was perhaps the 'Scholarus' who accompanied the Emperor John Palaeologus to Florence in an attempt to heal the schism between E. and W., but later, as a monk at Constantinople, opposed the union. After the fall of Constantinople (1453) G. was made patriarch by Sultan Mohammed II. After 4 or 5 years he retired, and d. in the monastery of St John the Baptist near Serrae, Macedonia.

Gennaro, San, see JANUARIUS, ST.

Gennesaret, Sea of, see GALILEE.

Genoa (It. *Genova*): 1. Prov. of Italy, in central Liguria (q.v.). It has a coastline on the Gulf of G. (q.v.), but is generally high-lying, with ridges of the Ligurian Mts (see APENNINES). The coastal plain (see RIVIERA) and the riv. valleys are rich in vegetation and well cultivated. The prin. ins include G. and Rapallo (qq.v.). Area 705 sq. m.; pop. 951,000.

2. (anc. *Genua*; Fr. *Gênes*) It. city, cap. of the prov. of G., and chief tn of Liguria, on the Gulf of G., 250 m. NW. of Rome (q.v.). It is the most important commercial port of Italy, and stands on the slopes and at the foot of the Ligurian Mts in a great natural amphitheatre, of which the harbour forms the centre. Founded in about the 8th cent. BC, G. was destroyed by Mago (q.v.) in 204 BC, but was afterwards rebuilt by the Romans. It was subsequently taken by the Goths and the Longobards (qq.v.), became part of the dominions of the Carolingians (q.v.), and by the beginning of the 10th cent. was an independent rep. By foreign trading it laid the foundations of its great commercial prosperity, its galleys took part in the Crusades (q.v.), and it imposed its rule on Corsica and Sardinia (qq.v.). The growing power and wealth of the city excited the rivalry of Pisa (q.v.) and a long-drawn-out struggle began, which culminated in the defeat of Pisa at Meloria (q.v.) in 1284. The Genoese traders developed colonies as far afield as Africa, Spain, Asia Minor, and the Black Sea, but this led to conflict with Venice (q.v.), and to the defeat of the Genoese at ChioGGia (q.v.) in 1380. The troubles of the city were further accentuated by internal strife between Guelphs and Ghibellines (q.v.) and by the rivalries of the prin. families. Other states intervened in these struggles, and G. was subjected in the 15th and 16th cents. by Milan (q.v.) and France. The city's independence was secured by Andrea Doria (q.v.); but its fortunes had begun to wane, it lost its oriental possessions to the Turks (q.v.), its trade declined as a result of the discovery of America, and it fell eventually under the domination of Spain. In 1684 it was bombarded by the Fr. because of an insult offered to the ambas. of Louis XIV, and the Doge (q.v.) was obliged to travel to Versailles (q.v.) to receive the king's pardon. In 1768 G. sold Corsica to France, and in the upheavals following the revolution in France the city was first made the metropolis of the 'Ligurian Republic' (1798) and was eventually incorporated in the Napoleonic empire (see FRANCE, *History*, and NAPOLEON I). After the fall of Napoleon, G. went to the House of Savoy (q.v.) as a duchy of the kingdom of Sardinia (1816), and thus it in time became part of united Italy. In 1922 the city was the scene of an unsuccessful economic conference, at which 29 countries were represented, among them for the first time Soviet Russia and the nations defeated in the First World War,

excepting Turkey. During the Second World War G. was bombarded by Brit. warships on 8 Feb. 1942, widespread damage being done to the docks and industrial estabs. Oil tanks, marshalling yards, and merchant ships also were hit, and large fires caused in shipyards and power installations. The port and tn also suffered severely in numerous air-raids. Altogether more than 50 churches, a dozen oratories, and 130 palaces and villas were damaged; the most serious and irreparable damage was that to the splendid interiors of the medieval palaces. G. was taken by the allied Fifth Army on

particular of works by Genoese artists. The archiepiscopal cathedral (partly 12th cent.) is mainly Gothic in style; it has a notable 16th-cent. campanile, and its façade is banded in black and white marbles. Among the other anct churches are the basilica of Sta Maria Assunta di Carignano (16th-18th cents.), which has 5 cupolas and contains remarkable baroque statues; the 12th-cent. church of Sta. Maria di Castello; and the 17th-cent. church of the Annunziata, to which belongs an important collection of 17th-cent. Genoese art. The univ. dates from 1243, and has a library of 450,000 vols.



E.N.A.

GENOA

The town and port, showing in the background the snow-capped Ligurian mountains

27 April 1945, after some parts had already been captured by the partisans.

G. is a picturesque city, widely spread out along the coast, and enclosed by hill slopes covered with buildings, gardens, and orange groves. In the lower part of the city proper there are the curious anct streets and *caruggi* (lanes) of the medieval tn; the splendid modern streets, fine squares, and imposing buildings of the commercial and residential dists.; the harbours, with their quays, moles, and famous *Lanterna* (lighthouse); and the magnificent sea promenade. Of the many palaces of G., the most celebrated are the Palazzo Ducale, once the residence of the Doges and now the Courts of Law; the 18th-cent. Palazzo Reale, containing many art treasures; the splendid 16th-cent. Palazzo Principe, which was once the 'court' of Andrea Doria; and the Palazzo Bianco, Palazzo Rosso, and Accademia Ligustica di Belle Arti, which have notable collections of paintings, in

Greater G. includes many industrial and other suburbs, and has metallurgical industries, and manufs. of marine and diesel engines, locomotives, armaments, electrical goods and components, cotton, and foodstuffs. There are important naval and merchant shipbuilding yards. The city has well-developed national and trans-Alpine road and rail communications, and the port is extremely busy: it is the outlet for a wide and productive region, and has imports of coal, oil, alcohol, ores, chemicals, textiles, foodstuffs, and tobacco, and there is also a large passenger traffic. Among the famous natives of G. were Columbus, Mazzini, Paganini, and, perhaps, Cabot (qq.v.). Pop. (city) 359,500; (greater G.) 656,400. See F. Donaver, *La storia della repubblica di Genova*, 1913; T. S. Mills, *The Genoa Conference*, 1922; M. Sibona, *Genova*, 1925; and H.M.S.O., *Works of Art in Italy, Losses and Surivals*, 1945.

Genoa, Gulf of, name given to the N. part of the Ligurian Sea (q.v.), between La Spezia and Imperia (qq.v.). Genoa (q.v.) is the chief city on the gulf.

Genocide, word of hybrid Graeco-Lat. etymology, coined by R. Lemkin, defined as the partial or wholesale destruction of religious, racial, or national groups. In 1941 Hitler, ruler of Nazi Germany, issued an order providing for the extermination of all Jews in Ger. hands. It is estimated that between 4,200,000 and 4,600,000 Jews perished between 1941 and 1945, about half the Jewish pop. of Europe at the time. Perhaps a third of these d. from overwork, disease, hunger, and neglect. The rest were killed in ghettos and concentration camps by shooting, gassing, etc. Hitler also decreed the extermination of the gypsies (q.v.) and a large number of them were killed. The U.N. War Crimes Commission took cognizance of G. and punished some of those responsible. In Dec. 1946 the U.N. Assembly issued a declaration against G. and 2 years later unanimously approved a Convention outlawing G. After being ratified by 20 states the Convention came into force in Jan. 1951. Although the Convention provides for reference to the International Court, some govts., notably that of the Union of South Africa, doubt whether it is a practical measure. Meanwhile the W. Ger. Gov. has paid compensation to the survivors and extensive reparations to the State of Israel. Some restitution has also been made by Austria. See R. Lemkin, *Axis Rule in Occupied Europe*, 1944; G. Reitlinger, *The Final Solution*, 1953.

Genova, see GENOA.

Genovesi, Saint, see GENEVIÈVE, St.

Genovesi, Antonio (1712-89), It. writer on philosophy and political economy, b. Castiglione. He started his career as an ecclesiastic, but very soon abandoned theology in favour of the law, which in turn was also given up for philosophy. In 1754 one of his patrons, Bartolomeo Intieri, a Florentine, founded the first It. or European chair of political economy on condition that G. was made first prof. His works include *Elementa Metaphysica*, 1745, et seq., *Logica*, 1745, and *Lezioni di Commercio*, the first complete It. work on economics. See G. M. Monti, *A. Genovesi e G. H. Galanti*, 1926.

Genre Painting takes for its subject the familiar scenes of everyday life, while 'historical painting,' in contradistinction to which the term has come to be used, takes great events.

Gens, in its historical and ethnological sense, a tribe or clan, or any group of primitive people forming a distinct branch of a race. The term was especially applied to a clan or house in anc. Rome which included a number of families bearing the same name and descended from a common ancestor, and also sharing certain legal privileges and obligations, and also religious rites. Originally these *gentes* were exclusively patrician, but later they included plebeians. The name

of the *gens* to which a Rom. belonged was indicated always by the middle of the 3 names which it was customary for a Rom. to possess.

Genesio, or **Gaiserio** (c. 390-477), king of the Vandals. He succeeded his brother Geoderic in 428. He invaded Africa from Spain, besieged the Rom. general Bonifacius in Hippo, and conquered the prov. with much pillage and slaughter. In 455 he invaded Italy and sacked Rome. G. also conquered Sicily, Sardinia, and the Balearic Isles. As an Arian he was a cruel persecutor of orthodox Christians.

Gentbrugge, tn in the prov. of E. Flanders, Belgium, forming an E. suburb of Ghent. It has manufs. of textiles, paper, nails, and rubber. There is a central workshop of the Belgian railways. Pop. 20,800.

Gentiana, family Gentianaceae; genus of over 200 species of alpine regions, N. hemisphere and Andes; named after King Gentius of Illyria, who is said to have discovered their medicinal value. They are noted for their brilliantly coloured flowers. *G. lutea*, yellow-flowering, perennial, is the source of Gentian-root of medicine. Native to Britain are *G. pneumonanthe*, marsh G., *G. verna*, spring G., and *G. nivalis*, the small G., an ann. *G. acaulis*, *G. septemfida*, *G. sino-ornata*, and *G. lagodechiana* are popular rock-garden plants.

Gentianaceae, family of dicotyledonous plants mostly of temperate regions. It contains about 900 species, mostly herbs, famed for their bitterness and the bright yellow, red, or blue of the flowers. The flowers are hermaphrodite; there are typically 5 united sepals and petals, 5 epipetalous stamens, 2 united carpels to form a superior ovary with numerous ovules; the fruit is a capsule or berry. Chief genera are *Erythraea*, *Gentiana*, *Helenia*, *Limnanthemum*, *Menyanthes*, *Orphium*, *Suertia*, etc.

Gentile, Giovanni (1875-1944), It. philosopher, b. Castelvetro, Sicily. Educ. at the univ. of Palermo. In 1918 he became prof. of the hist. of philosophy in the univ. of Rome. He was made senator the same year. In 1920 he founded the *Giornale critico della filosofia italiana*. G. was in the Fascist ranks from the first, and became minister of education in Mussolini's first Cabinet. He was also Fascist minister of science and arts; president of the Academy of Sciences and Arts, Florence. His philosophy, which he implemented in his ministerial work, transcends that of Croce, being even more lyrical and objectless in its professions. It is, in practice, the philosophy of Fascism, with its roots in Vico, who believed in a something corporate, not composed of our individual selves, that makes for national glory. With Croce, precedent and idea have some controlling force; with G., apparently none—the dominant will is sufficient reason. G. was shot by partisans in 1944. See E. Chiocchetti, *La filosofia di Giovanni Gentile*, 1925; and

G. De Ruggiero, *Filosofi del Novecento*, 1934.

Gentile da Fabriano, see FABRIANO.

Gentili, Alberico (1551-1611), It.-Eng. jurist, b. San Ginesio, in the march of Ancona. He was a doctor of civil law of the univ. of Perugia, but left Italy in consequence of having adopted Protestantism. In 1588, through the patronage of the earl of Leicester, he became regius prof. of civil law at Oxford. His chief work is the *De Jure Belli libri tres*, 1598, but his earliest known work was the *De Legationibus*, pub. in 1585. The *De Jure* was an enlargement of the *De Jure Belli commentatio prima*, pub. in 1588, and 2 other treatises of the following year. They treat of the laws of war, the causes of making it, the mode of carrying it on, and the rights of conquerors and conquered—all opportune topics when England was threatened by the Armada (1588), and the attitude of the Eng. Catholics to the question whether a Papist was right in serving his prince in arms against the pope raised important issues. According to Prof. Westlake G. rushed into print in 1589 without giving himself time to elaborate his important subject with the fullness he afterwards gave it in the greatly expanded work of 1598. This classic, indeed, is admittedly superior to the work of Ayala (q.v.), being far more complete and free from the irrelevant consideration of tactics and military administration. But it is inferior to the work of Ayala in principles, notably in its manner of dealing with the cardinal problem of whether a war can be *justum bellum* on both sides, so as to have legal effects, i.e. in changing the ownership of things captured. Nothing, either, is to be derived from G. in mitigation of the ferocity of war; and, again, he agrees that it is both just and expedient to kill hostages. The best Eng. ed. of the *De Jure* is that of T. E. Holland, 1877. See also *The Collected Papers of John Westlake on Public International Law*, 1914.

Gentleman. The term 'G.' is of very vague and shifting meaning to-day, but though it has almost become a politer synonym of 'man,' as 'lady' has of 'woman,' everyone recognises that, properly regarded, it implies something of good manners, good taste, good education, and good feeling for others. In a more usual and general sense it is applied to one of a certain social position, and its definition may range from the celebrated one of a 'man who keeps a gig' to that of one who, by birth, education, wealth, or manners, occupies a certain place in society, without, nowadays, much reference to his profession, business, or trade. It is of more interest to turn to the hist. of the term, which has been much confused since, in the 16th and 17th cents., a fiction of official heralds made 'gentlemen' and 'gentry' a separate order or rank and confined its members to those who had the right to bear a coat of arms as recognised by the college of heralds. Antiquaries and historians have much disputed whether in England there ever

was a distinct order corresponding to the lesser noblesse of France or Germany (*Adel*). Certainly there never was a distinctive mark attached to a name, signifying such a rank as is found in the nobiliary particles *de* in Fr. or *von* in German. Early Eng. records in which 'de' occurs imply the place where the man or family lived, and in the 15th cent. the word was dropped; thus Wm de Pedlington became Wm Pedlington. Apart from this, the definite early meaning was that of its derivation, a man of 'gentle' birth, Lat. *gentilis*, and so in genealogies, etc., *generosus*. See W. Harrison's *Description of England*, ii. 5, 1577; and J. Selden's *Titles of Honour*, 1671; the most interesting researches of Sir George Sitwell, 'The English Gentleman,' *Ancestor*, April 1902; and for an exhaustive collection of quotations, etc., A. Smythe Palmer, *The Ideal of a Gentleman*, 1908.

Gentleman's, or Gentlemen's, Agreement, an informal undertaking, binding in honour but not ratified by any written contract, treaty, or the like.

'**Gentleman's Magazine**' was estab. in 1731 by Edward Cave, and was the first example of the use of the term magazine. It began by reproducing matter from the weekly journals, with a supplementary section giving the prin. news of the month, a list of births, marriages, and deaths, etc., and a register of books pub. A few years later original matter began to appear, including the 'Debates in the Senate of Lilliput.' It was valued for its plates and engravings, and especially for its biographical, historical, and antiquarian articles, which give its old vols. much interest. Samuel Johnson (q.v.) joined the staff in 1739, and wrote, from notes taken by others, the reports of debates in Parliament. The magazine was discontinued in 1914.

Gentlemen-at-Arms, in full the 'King's Bodyguard of the Honourable Corps of Gentlemen-at-Arms,' consists as at present constituted of 39 'gentlemen,' being officers of the army who have been decorated for war services. Their officers are the clerk of the cheque, the adjutant, the sub-officer (or harbinger), the standard-bearer, the lieutenant, and the captain, the last of whom must be a peer and a member of the ministry, retiring with the gov. The corps was estab. as a purely military body in 1862, and officiates as the first bodyguard of the sovereign at palace functions and royal ceremonies. It directly descends from the body of 'pensioners,' founded by Henry VIII in 1509, who were the younger sons of noble families.

Gentz, Friedrich von (1764-1832), Ger. publicist and statesman, b. Breslau, and educ. at Berlin and Königsberg (under Kant). A trans. of Burke's essay on the Fr. Revolution, 1794, was followed by other trans. and the founding of a jour. in which his articles soon became famous. He served for a time under the Prussian Gov., but in 1804 he went to Vienna and entered the service of the Emperor Francis. Throughout the war between

Austria and France he was employed by Stadion in writing proclamations, etc., and, when Metternich succeeded the latter, he became his chief adviser. He was secretary to the congress of Vienna (1814-15), and to all those that followed, and remained a power until his death, becoming increasingly reactionary as he grew older. See life by G. Mann, 1946.

Genus, see GENOA.

Genus (plural **Genera**), in biological nomenclature, a group of species with common characters of structure, presumed to have derived in the remote past from a common ancestor. In animals, for instance, the main characters relied upon in defining genera are the limbs and toes, teeth, diet, skull and brains; in plants, they are found chiefly in the flower, seed, and fruit. The number of species in a G. may be large as in *Gentiana* (about 400 species), or it may be only one so distinguishable structurally from the nearest relatives as to stand alone, as in *Chioya*. In designating an animal or plant, the name of the G. is placed first, in italics, with a capital initial letter. Genera having major characters in common are grouped to form a family. See CLASSIFICATION, PLANT.

Genzano di Roma, It. tn, in Lazio (q.v.), 16 m. SE. of Rome (q.v.), built on the hill slopes near Lake Nemi. It is famous for its traditional 'Infiorata.' On the feast of Corpus Christi a m. of the main street is carpeted with flower petals arranged in a series of pictures of religious themes. Only the Blessed Sacrament, borne by the archbishop, treads the carpet. Pop. 10,500.

Geochronology, young branch of science, which draws its methods from geology, botany, zoology, and physics, and whose chief objective is the development of time-scales in years which extend back into the distant past beyond the historical calendar. The first field of application of G. is in prehistoric archaeology and human palaeontology; the second is that of biological evolution in relation to time. See F. E. Zeuner, *Dating the Past: an Introduction to Geochronology*, 1950.

Geodesy (Gk *gē*, Earth; *daiein*, divide) is essentially the science and art of surveying on a large scale in order to ascertain the true form and dimensions of the earth. To this end the most rigorously exact methods of measurement at all stages must be employed. Angular measurements involve the use of theodolites of the most perfect construction, graduation, and workmanship, while linear measurements may be made by compensated metal rods, glass rods, pine rods, steel wires, steel or invar tapes or chains under precise tension, all carried on specially designed and accurately levelled supports and read by microscopes in conjunction with standard thermometers. Corrections are applied for the earth's curvature, reduction of observations to mean sea level and standard temp., variations in gravity, instrumental and personal errors, etc. Small errors, which would be negligible in a small survey,

multiply enormously over countries whose areas may cover hundreds of thousands of sq. m. Hence the need for the extremely high standard of accuracy involved in geodetical surveying and the explanation of its being accepted as the basis for all forms of surveying—of which there are many.

The problem of the earth's figure—quite apart from utilitarian aspects—has occupied men's minds from very early times. Probably the earliest recorded effort was that of Eratosthenes, a Gk mathematician, who, in the 3rd cent. BC, on Egyptian soil, essayed to measure an arc of the meridian between Syene and Alexandria. He found that at Syene, the modern Aswan, the sun was vertical at noon at the summer solstice, and that it was 7.2° from the vertical at the same time at Alexandria. From this he deduced that the arc on the earth between the 2 places was 7.2° and hence, as the circumference of the earth was 360° , the ratio of the earth's circumference to the distance between Syene and Alexandria was $360/7.2 = 50$. By measuring the distance between the 2 places, which was 5000 stadia, he found that the earth's circumference was 250,000 stadia—24,467 m., if his stadium was 516½ ft. Considering the crude instruments then available the result of this early operation was surprisingly accurate. More than a thousand years now intervened, until at last man's scientific instincts again slowly awoke.

The geodetic measures which most materially contributed to the historic determination of the figure of the earth are singularly few. They are: (1) the arc de Pérou measured by the Fr. academicians P. Bouguer and C. M. de la Condamine in the middle of the 18th cent.; (2) the Fr. arcs measured by Delambre and Méchain about the end of the 18th cent. and by Biot and Arago early in the 19th; (3) the Brit. arc from Dunnose in the Isle of Wight to Saxavord in the Shetlands; (4) the great arc of meridian of India; (5) the Russo-Scandinavian arc from Hammerfest to the mouth of the Danube; (6) various triangulations in central Europe by Schumacher, Gauss, and Bessel; (7) Maclear's arc at the Cape of Good Hope. Many efforts have also been made by different observers to determine the figure of the earth from the behaviour of pendulums at different lats. in different parts of the globe; but the results have been both unexpected and inexplicable. Observations on arcs of meridians have revealed similar discrepancies. By the middle of the 18th cent. it was definitely accepted for the N. hemisphere that the further one goes N. the greater is the distance corresponding to a degree of lat.; the flatter therefore is the earth towards the poles. But the result of the abbé de Lacaille's measure of an arc of meridian at the Cape of Good Hope was a contradiction—as it seemed to show that the S. hemisphere was prolate, the degree decreasing in length as the pole was approached! A somewhat similar dis-

crepancy was found in England—the curvature of the S. half of England appearing to be less than the N. half!

The origin of these and other abnormal results has been interpreted by local irregularities in the direction of gravity due to the unequal distribution of mass in the crust of the earth.

The principle of triangulation forms the sole foundation for all large-scale geodetic surveying (q.v.), in which the greatest attainable accuracy is essential. This principle rests on the basic mathematical fact that every triangle has 6 parts—3 sides and 3 angles; and that if any 3 of these parts (1 of them, at least, being a side) are known, the remaining 3 parts can be calculated, without any further measurement, either of sides or angles. With this new information, contiguous new triangles can be constructed by taking angular observations from the terminal points of the new sides to well-defined prominent natural objects such as church steeples or new artificially constructed stations with flag-staffs or other permanent signals—this process being continued indefinitely. The first requisite, therefore, of any geodetical survey is to start the triangulation with a very carefully selected base line, say from 5 to 10 m. long, reasonably level, measured with extreme accuracy as already generally described, and subject to complicated corrections and adjustments. The usual method of meridional triangulation is for a chain of 'well-conditioned' triangles to be formed in the required direction, as in France, Spain, and Austria; while in Italy, Sweden, Norway, Germany, Russia, and U.S.A. oblique chains of triangles are formed. Occasionally, as in India, the combination of triangles forms successive polygonal figures, the sides of the triangles seldom exceeding 40 m. in length. The whole area of India has now been surveyed. (For corresponding progress in Great Britain and Ireland, see *ORDNANCE SURVEY*.)

So far as is known, the principle of triangulation was first applied by Snellius, a Dutchman, in 1615, with the primitive instruments then available. The subsequent observations of Richer caused Huygens and Newton to question the hitherto current assumptions that the earth was a perfect sphere, and actual measurements of terrestrial arcs were accordingly undertaken, as already described, and are going on in many parts of the world to-day. Although for the purpose of geodetical surveying the figure of the earth is provisionally regarded as spherical (in order to admit the direct application of spherical trigonometry), it is now estab., as a result of the extensive surveys already made, that the figure of the earth is an irregular *geoid*, which closely approximates to that of an oblate spheroid. This latter is a regular geometrical solid generated by the rotation of an ellipse about its minor axis, the ratio of the minor (polar) and major axes in the case of the earth being about 300 to 301.

The importance of geodetic surveying

has been increasingly recognised, and advances in scientific knowledge and in the construction of instruments of remarkable precision have led to the formation of an International Geodetic Association which, among other matters, prescribes methods and the limits of allowable errors in the conduct of operations. Base lines are measured on either (1) the long-length or (2) the short-length systems. The former includes the apparatus of Jadarin, Wheeler, Guillaume-Carpentier, etc.; the latter that of Colby, Bessel, Borda, Struve, Ibanez, etc. There have been alternating vogues, but now the long-length system appears to be generally favoured.

As regards steel base tapes, these consist of corrections due to (1) temp., (2) elasticity, (3) sag, and (4) slope; reduction to sea-level datum being a later consideration. In calculating the lengths of the sides in a system of spherical triangles 3 methods may be employed: (1) spherical trigonometry, (2) Delambre's method, (3) Legendre's method. Most of the triangles of the U.K. Ordnance Survey were computed by Delambre's method and checked by Legendre's method, while all 3 methods were used in the calculations in connection with the meridional arc which formed the basis of the metric system. Instrumental and observational errors constitute another class requiring corrections. They may take the form of discrepancies between results obtained by different methods and different series of measurements. They involve the 'weighting' of observations and the theory of probabilities, and are generally adjusted by what is known as the method of 'least squares' (q.v.).

The *rigid* application of this most accurate method to the geodetical survey of the Brit. Isles would have entailed the solution of 920 equations of condition and the same number of unknown quantities as a part of the work. Avoiding this, the triangulation was divided into 21 'figures,' the equations being reduced to a maximum of 77, with an average of 44 in a figure. Each section (or figure) had its own staff of computers and they were thus enabled to complete the work within their lifetime! Having accomplished its primary aim of determining the figure of the earth the geodetical survey movement, as a whole, has fulfilled other important functions—for example, the preparation of accurate maps of nearly every country in the world, and the estab., both in the field and on the maps, of permanent stations, or 'trig-points,' between which subsidiary topographical or other surveys could be subsequently fitted in. Material for geological and archaeological survey, also, was incidentally accumulated, with great benefit in the case of Ireland. Theodolites (q.v.) used in a geodetical survey vary in size according to the importance of the station to which they are assigned and the quality of the work they have to do. In the U.K. Ordnance Survey the diameter of the horizontal circles ranged from 10 to 36 in. The instruments rested

on a firm foundation accurately centred over the station point, which was permanently marked for future identification and protected (not always successfully) from ignorant despoilers.

Scaffolding and signalling arrangements between stations are important. When it is necessary, for the purpose of commanding particular points, to elevate the theodolite, a framed triangular scaffold may be used; around this an independent rectangular scaffold for the observer; and, inside the instrument scaffold, a wooden tube will be provided to shield the plumb line—preferably made to rotate so that the leeward side can remain open for inspection. The scaffolds for the U.S.A. Great Lakes Survey ranged from 10 to 124 ft high, with an average height of 58 ft—the signal standards being from 5 to 30 ft higher. It is found desirable that all arcs at a station should have one point in common to which all angular measurements may be referred; this is known as the referring object. On mt tops 2 rectangular plates of metal are placed in parallel, so that light seen between them against the sky appears as a vertical line about 10 sec. in width; this artificial referring object will be set up at a distance of from 1 to 2 m. away from the observatory. See also GEOGRAPHY; GREENWICH OBSERVATORY; 'LEAST SQUARES'; ORDINANCE SURVEY; SURVEYING; THEODOLITE, etc. See T. Pilkington White, *The Ordnance Survey of the U.K.*, 1886; J. H. Gore, *Geodesy*, 1891; A. R. Hinks, *Maps and Survey*, 1942; and A. L. Higgins, *Higher Surveying*, 1944.

Geodorum, small genus of Orchidaceae which are found in the West Indies; they are called earthy-scented orchids, with leafless flowering scapes.

Geodynamics, see PHYSICAL GEOLOGY.

Geoffrey of Monmouth (c. 1100–1154), bishop of St Asaph and author of a Brit. hist. His first ed. of the famous *Historia Britonum* of Nennius was pub. in 1139, though the text now preserved apparently dates from 1147. According to the author the book was a trans. of a Celtic MS, which Walter, archdeacon of Oxford, had brought from Brittany, but the work is actually a mixture of historical fact and tradition culled from Nennius and the author's own fertile imagination. In any case the result was immediate success, and his influence on the literature of the next hundred years was unmistakable. The Arthurian legend was the most popular and laid the foundation of an abundance of poetry and prose, becoming immortalised in Malory's *Morte d'Arthur*, printed by Caxton in 1485. *The Prophecies of Merlin*, long attributed to him, is now held by many critics to be not genuine. See E. K. Chambers, *Arthur of Britain*, 1927.

Geoffrin, Marie Thérèse (née Rodet) (1699–1777), Frenchwoman, b. Paris, who was for a time the leader of a brilliant literary salon in Paris. At an early age she married Pierre François G., a lieutenant-colonel in the National Guard, and it was not until a few years before his

death in 1750 that she became a leader in society. Twice each week she would entertain at dinner artists and literary men of her acquaintance, towards whom it pleased her to play the mentor. Montesquieu, Voltaire, Hume, and Horace Walpole were among those who visited her, also Stanislas Poniatowski, whom she afterwards visited in 1766 as king of Poland. Her great delight seems to have been to gather round her the encyclopaedists, she herself being one of the contributors to the *Encyclopédie*. Her *Lettres* and a work entitled *Sur la conversation* were pub. by Morellet. See *Correspondance inédite du roi Stanislas Auguste Poniatowski et de Madame Geoffrin*, 1764–77, ed. by the Comte de Mouÿ, 1875; P. de Ségur, *Madame Geoffrin et sa fille*, 1897; and Janet Aldis, *Madame Geoffrin, her Salon and her Times*, 1750–77, 1905.

Geoffroy Saint-Hilaire, Étienne (1772–1844), Fr. naturalist, b. Étampes, in the dept of Seine-et-Oise. From 1793 to 1798 he was prof. of zoology at the natural hist. museum in Paris, then he went to Egypt with the scientific expedition sent out by Napoleon Bonaparte. In 1809 he was appointed prof. of zoology in the Faculty of Sciences and pub. a number of works on his theory of the unity of all organic composition, a subject on which he had a famous controversy with Cuvier. His works include *Philosophie anatomique*, 1818–20, *Sur le principe de l'unité de composition organique*, 1828, and *Philosophie zoologique*, 1830. See life in Fr. by his son, 1847, and Cuvier et Geoffroy Saint-Hilaire, 1890, by Ducrotay de Blainville.

Geoffroy Saint-Hilaire, Isidore (1805–1861), Fr. naturalist, b. Paris. He was the son of Étienne Geoffroy Saint-Hilaire, and helped his father in his work until 1838, when he went to Bordeaux to organise a faculty of sciences, remaining there as prof. of zoology following his appointment in 1850.

In 1854 he founded the Acclimatisation Society in Paris, becoming the first president. He pub. the life of his father in 1847. Other works include *Histoire des anomalies de l'organisation chez l'homme et les animaux*, 1832–7; *Essais de zoologie générale*, 1841, and *Histoire naturelle générale des règnes organiques*, 1854–62 (unfinished).

Geographical Distribution. The problem of G. D. of animals and plants over the earth's surface has been the subject of close study in modern times. The greatest impetus to such study was given by Darwin's *Origin of Species*, which destroyed the idea that each species was the result of a separate act of creation. The allied species being regarded as having a common origin, it followed that they had a common place of origin, and an explanation of how they came to inhabit the different quarters of the globe in which they are at present found necessarily involves an explanation of many unsolved problems of biology. Both flora and fauna will thrive only in the environment

adapted to them, but it is found that animals and plants are absent from countries that appear quite suitable to their development. The existence of natural barriers offers some explanation of this. Thus, Australia is cut off from terrestrial communication with the rest of the world, and so possesses a fauna peculiar to itself, but fossil evidence indicates that Amer. opossums may have been related to the marsupials of Australia, and it is supposed that Antarctica was once continuous with New Zealand, Australia, and South America. Madagascar and Australia were probably cut off from the mainland mass in a comparatively recent geological period. Such isolated regions tend to contain specimens of the fauna which fl. before the separation. The Himalaya mark a great distinction in the fauna to the N. and S., while in Africa the Sahara desert does the same. On the other hand, the mammals of the West Indies are practically the same as those of America, and the inference is that they have in some way migrated from the mainland. Peculiarly enough, however, the West Indies possesses one mammal which 'belongs to an order, Insectivora, entirely absent from South America, and to a family, Centetidae, all the other species of which inhabit Madagascar only' (Alfred Russel Wallace). Similar interesting problems are offered by the fact that the fauna of Japan more closely resembles that of the Atlantic states than of the Pacific states of North America; that the mammals and birds of North America approximate more to those of Europe than of South America; that the fauna of Madagascar has much in common with that of the Malay Archipelago; and so on. In considering such questions attention must be paid to the processes by which the distribution of species can take place. Natural locomotion is, of course, the usual means, and birds possess the greatest power in this respect. Apart from normal methods, however, there are other agencies at work. The wind can convey the spores and seeds of plants many hundreds of m. Winds are also of great account in conveying insects, while birds are often blown immense distances out of their course, and the eggs of fish, frogs, etc., are often conveyed by the wind moving the surface of the water. Sea currents are an important factor in the distribution of plants and animals. Darwin (see *Origin of Species*, c. xii) conducted a series of experiments that showed the great vitality of seeds after immersion in salt water for periods varying from 28 to 137 days, and also the power that seeds possess of floating for prolonged periods upon the surface of the water. In addition, animals are conveyed by sea currents upon such natural rafts as icebergs and icefloes, drifting trees, &c. Birds may convey seeds or insects upon their feathers or in the earth adhering to their feet, while many seeds pass uninjured through the digestive organs of birds and beasts and are thereby transported to new lands.

Distribution is, on the other hand, pre-

vented by many methods. Mammals migrate slowly, and mts, deserts, and marked differences of temp. are barriers to their distribution. Forests hinder the migrations of camels, giraffes, zebras, etc., treeless regions those of apes and monkeys. Climate also impedes dispersal, while the presence of a natural enemy has also to be taken into account. The tsetse fly, for example, which conveys the parasitic trypanosome causing the disease nagana, has prevented the introduction of horses, dogs, and cattle into a certain area in Africa, while another fly acts in the same way in Paraguay. The more evenly the various species are distributed over the globe the less easy it is to map out the regions they inhabit, and the less valuable are the possible deductions to be made therefrom. The cryptogams, whose spores are carried in all directions by the wind, are so widely distributed that they are usually left out of all biogeographical schemes. In the same way it is difficult to mark off fixed limits for sea animals, although attempts have been made to do so by classification into littoral, pelagic, and abyssal fauna, according as the animals inhabit the sea near the shore, the open sea, or the depths of the ocean. Again, birds, having greater power of locomotion, are more widely distributed than other mammals. North America and Asia were great centres of evolution, and, as successful new species were evolved, the survivors of dying-out races were driven to the S. ends of the land masses.

Distribution of Animals.—The following is the scheme of distribution of animals adopted by A. R. Wallace in his *Island Life*. It is based principally upon the distribution of land mammals, but corresponds with a considerable degree of accuracy to that of birds. It includes 6 divs.: (1) Palaearctic region, including Europe, temperate Asia, and Africa to the N. of the Sahara. (2) Ethiopian region, including Africa, S. of the Sahara, and Madagascar. (3) Oriental region, including India, S. of the Himalaya, S. China, and the Malay Is., as far S. as the Philippines, Borneo, and Java. (4) Australian region, including Australia, New Guinea, Celebes, Lombok, and the is. of the Pacific, New Zealand being regarded as a very peculiar sub-region. (5) Nearctic region, including North America as far as Mexico. (6) Neotropical region, including central and South America with the West Indies. The above scheme, though favoured by its simplicity, is nevertheless hardly sufficiently accurate. For example, it ranks the div. between the Nearctic and Palaearctic regions, whose faunas have much in common, as high as that between the Australian and Neotropical, where the faunas are of quite different character. For this reason modifications of it have been advocated by Heilprin and other biologists. These systems will be found fully dealt with in R. Lydekker's *A Geographical History of Mammals*, 1896. The following is the system now usually adopted: (1) Arctogealic realm, divided

into 5 regions—(a) Holarctic regions, including the Palaearctic and Nearctic regions of Wallace's div., with the exception of parts of Mexico and California; (b) Oriental region as in Wallace's system; (c) Ethiopian region as in Wallace's system, except Madagascar and adjacent isles which form the (d) Malagasy region; (e) the Sonoran region, embracing the NW. parts of Mexico and Lower California.

(2) The Neogaëic realm, corresponding with the Neotropical region of Wallace's system. (3) The Notogaëic realm, including Australasia, divided into 4 regions—

—(a) Australian region, i.e. Australia proper, Tasmania, and New Guinea; (b) Austro-Malayan region, containing the is. between New Guinea and Bali; (c) Polynesian region, containing New Zealand and certain isles of the Pacific; (d) Hawaiian region, including the Sandwich and other is.

In the Holarctic region are found such distinctive mammals as the bear, sheep, gibbon or wolverine, marmot, reindeer, beaver, bison, skunk, and raccoon. The Oriental region includes the elephant, hyæna, tiger, leopard, panther, tapir, rhinoceros, monkey, ape, crocodile, as well as deer, cattle, and pigs. The Ethiopian region includes the elephant, hippopotamus, giraffe, zebra, rhinoceros, antelope, panther, leopard, lion, gorilla, chimpanzee, and lemur; the Malagasy region is characterised by a prevalence of lemurs, and by the absence of the African mammals; while the Sonoran region shows a mixture of Arotogaëic and Neogaëic forms. In the Neogaëic realm are to be found anteaters, llamas, sloths, armadillos, tapirs, and peccaries, marmosets, opossums, alligators, crocodiles, humming-birds, etc., while there is an absence of sheep, horses, and goats. In the Notogaëic realm we find in the Australian region an abundance of marsupial or pouched animals, such as the kangaroo, wallaby, etc., as well as the monotremes (duck-billed platypus and spiny anteater), which are peculiar to this region; in the Austro-Malayan region a mingling of Australian and Oriental forms; in the Polynesian and Hawaiian regions an absence of mammals, the 2 latter regions being distinguished only on account of the difference of their birds. The peculiar nature of the Australian fauna, which consists of a great variety of marsupials and lacks almost all species of mammals existing in the rest of the world, has been explained by Wallace as being due to the fact that the marsupials formerly spread over the rest of the world, but were gradually displaced by later types of mammals and only managed to survive in Australasia owing to their isolation. The boundary line between the Australasian and other systems is the deep channel between the is. of Bali and Lombok, and is known as Wallace's line.

The Distribution of Plants.—The distribution of plants has been the subject of many attempts at classification, but has not yielded any scheme which is so clearly defined as that given for animal life. As early as the middle of the 18th cent. we

find the Linnaeans attempting to account for the distribution of plants over the surface of the globe. At the beginning of the 19th cent. Alexander von Humboldt paid great attention to the question of botanical geography, and suggested the use of distribution maps, while J. F. Schouw. a Dan. botanist, enunciated a system in 1833, dividing the earth's surface into 18 kingdoms occupied to a greater or lesser extent by characteristic flora. He, however, made no attempt to deal with the origin and hist. of the various plant forms, but regarded them rather as created to a great extent in the locality in which they are found. Some years later, Meyen divided the globe into zones, adopting lines of lat. as the zone frontiers. His system comprised the following 8 zones: (1) Equatorial, lying between 15° N. and S. lat.; (2) Tropical, extending N. and S. from the 15th parallel to the tropics of Cancer and Capricorn; (3) Sub-tropical, from the tropics to 34° N. and S. lat.; (4) Warner Temperate, between 34° and 45° lat.; (5) Colder Temperate, between 45° and 58° lat.; (6) Sub-Arctic, from 58° N. lat. to Arctic Circle; (7) Arctic zone from Arctic Circle to 72° N. lat.; (8) Polar zone, above 72° N. The Antarctic region was left out of account in this scheme as possessing no land flora. It was subsequently modified by the substitution of isotherms for parallels of lat. as the zone-boundaries, but was only a very general div. of the earth's flora. The 1st zone was characterised by palms and bananas and extremely luxuriant vegetation, the 2nd by tree-ferns and figs, the 3rd by myrtles and laurels, the 4th by magnolias, the 5th by forests of deciduous trees, the 6th by conifers, the 7th by dwarf birches, alders, and willows, and by lichens, the 8th by saxifrages and cryptogams.

After Meyen, de Candolle proposed a scheme of grouping plants, the main principle of which was the consideration of the temp. necessary for their growth. In it plants were divided into *megatherms*, *mesotherms*, and *microtherms*, according as they required a tropical, moderate, or cool temp. This scheme had the advantage of being applicable to vertical as well as horizontal distribution, but is now obsolete. The first real step towards classifying the distribution of plants upon modern lines was, however, made by Bentham in 1869, in his presidential address to the Linnean Society. He recognised the existence of 3 floral realms (1) the N., including conifers and deciduous forest trees, together with the ranunculuses (buttercups), spreading over Europe, N. and Central Asia, and the greater part of North America; (2) the Tropical, lying between the N. and S. realms and characterised by evergreen Polypetalæ (i.e. with the petals of the flowers not fused) and palms; (3) the S., containing the flora of the lower part of South America, South Africa, and Australasia, much more complex than the N. realm, and broken up into many scattered floras, which also sent extensions northward across the equator into the N. realm, as

exemplified by the flora of Mexico and California. Benthams successors were led to study the question of distribution from a historical aspect, and arrived at the conclusion that the tropical flora during the Tertiary period extended far beyond its present limits. In particular de Saporta studied the fossil flora of the Eocene period in Provence, and found that it was closely akin to that of India, China, and the Philippines. These and other investigations led to a scheme of distribution based upon the state of the flora of the Tertiary period, in which Drude and Engler have specially distinguished themselves. The scheme made out by Drude is much the simpler. He distinguishes sea flora from land flora, and divides the latter into 3 main groupings: (1) the Boreal group, including the N., Inner Asiatic, Mediterranean, E. Asiatic, and Central N. Amer. sub-groups; (2) the Tropical group, including the Tropical African, E. African Is., Indian, and Tropical Amer. sub-groups; (3) Austral group, including the South African, Australian, New Zealand, Andine, and Antarctic sub-groups.

Engler's system is far more complicated. He first distinguishes 4 main 'elements' in the flora of the Tertiary period, viz.: (1) the Arcto-Tertiary, characterised by abundance of conifers and numerous genera of trees and shrubs now common in North America, Europe, and Extra-tropical Asia; (2) the Palaeotropical, characterised by many families prevalent in the tropical parts of Africa and Asia, and by the absence of certain families found in the Arcto-Tertiary element; (3) the Neo-tropical or South American, which had, according to Engler, very much the same character as the present flora of Tropical Brazil and the West Indies; (4) the Old Oceanic, consisting of forms capable of traversing wide stretches of water and of developing upon is.

Upon the lines of these 'elements' of Tertiary flora Engler divided the flora of the present day into 4 'kingdoms,' each being further subdivided as follows: (1) N. Extra-tropical, including the 9 divs.: Arctic, Sub-Arctic, Central European, Central Asiatic, Micronesian Is., Mediterranean, Manchu-Japanese, Pacific North America, and Atlantic North America; (2) Palaeo-tropical, including the 10 divs.: West African, Afro-Arabian, Malagasy, Further Indian, Tropical Himalayan, E. Asian, Malayan, Aracanian, Polynesian, and Sandwich Is.; (3) South American, including the 5 divs.: the Mexican Highlands, Tropical America, Andean, the Galapagos, and Juan Fernandez; (4) Oceanic, including the 8 divs.: Antarctic South America, New Zealand, Australian, Kerguelen, Amsterdam Is., the Cape, Tristan da Cunha, and St Helena. Since Darwin drew attention to the operation of natural selection, it has been generally accepted until quite recently that species and genera few in number were relics of unsuccessful and moribund races. J. C. Willis, however, has given conclusive evidence that this is

not necessarily the case, for just as natural selection requires long periods for the conclusion of its operations, long periods of time are also essential for the dispersal of new species. If natural barriers prevent this dispersal, the new species will remain local and cover only a comparatively small area. Even so, it may maintain its position without decreasing if it be well estab., but any new species not adapted to the environment will be killed almost immediately by the operation of natural selection. On the other hand, if no natural barriers hinder the distribution, the species, given sufficient time, will gradually spread. Thus the areas occupied by plants may give an indication of the relative ages of the species, the oldest being those which have had time to become widely distributed. Moreover, in the case of is. separated early in geological hist. from the mainland, birds probably were some of the most active agents of plant dispersal, but in the course of time the birds became better adapted to conditions of life on the is. and visited the mainland less frequently, until at the present time birds take very little part in plant dispersal beyond the boundaries of such is. Consequently, new species arising in such isolated positions have more limited means of dispersal and will spread very slowly, if at all.

On account of the cooling of the N., plants and animals have migrated southwards. At some time in the future a northward migration will almost certainly be evident, for as species living near the present N. temp. barriers become acclimatised, or better adapted species are evolved, these barriers will recede. The importance of time for distribution cannot be too strongly emphasised.

See C. Darwin, *Origin of Species*, 1859; A. Murray, *Geographical Distribution of Mammals*, 1866; G. Benthams presidential address to the Linnean Society, 1869 (*Journal Linnean Society*, x); H. Bergson, *Creative Evolution*, 1907; M. I. Newbigin, *Plant and Animal Geography*, 1936; A. MacTaggart, *Plant Immigrants and Slowways*, 1945; R. O. Good, *Geography of Flowering Plants*, 1947.

Geography is that branch of science which deals with the phenomena of the earth's surface. The early Gk concept of the earth was that of a flat disk in the shape of an ellipse bounded by an ocean riv. This concept was generally held during the Homeric period. The Phoenicians were among the first people to explore unknown lands, and they navigated the whole of the Mediterranean and the Euxine, and passed through the straits of Gibraltar into the Atlantic. They planted colonies in Asia Minor and along the shores of Africa, one of which, Carthage, founded in the 9th cent. bc, was later to dispute with Rome the supremacy of the world. Certain Phoenician explorers were also reputed to have circumnavigated Africa during the 7th cent. bc. Thales of Miletus is claimed as the first advocate of the spherical earth, which was afterwards adopted by the

Pythagorean philosophers, mainly upon the theoretical ground that the sphere was the most perfect figure. Herodotus of Halicarnassus (b. 484 BC) has left us in his *History* a complete account of the earth's surface as known in his time, when it was held to be bounded by the Atlantic on the W., the Red Sea and Indian Ocean on the E., and Persia on the S. (The conquests of Alexander, however, opened up new realms to human knowledge, and the conqueror himself sent forth expeditions to survey the various regions he had subdued. About the same time, Pytheas of Massilia led an expedition into the Atlantic, through the Eng. Channel to the North Sea, and it is reputed to have reached Thule, which is supposed to be the modern Iceland.) Aristotle (384-322 BC) devoted considerable attention to the subject of G., and urged 3 reasons for holding the earth to be a sphere: (1) the tendency of all objects to fall together towards a common centre; (2) the fact that the earth's shadow upon the moon during an eclipse was circular; (3) the shifting of the horizon and appearance of new constellations during a journey from N. to S. He also extended Parmenides's idea of the earth's zones, defining the temperate zone as extending from the tropics to the Arctic Circle, though it is not clear in what sense he used the latter term. Aristotle was also aware of the connection between seas, rain, and rivers, and studied the effect of climate upon the character of the different races. Further progress in scientific G. was made by Eratosthenes (b. 276 BC), who was the first to use the parallels of lat. and long. He held the earth to be a sphere revolving in space, but to him the inhabited portions included only S. Europe, S. Asia, and N. Africa.

During the Rom. empire G. became more a question of actual description of the known world, and Strabo, at the very beginning of the Christian era, summarised all the knowledge of the earth's surface that had been acquired up to the time of Augustus. To Strabo succeeded Pliny (b. AD 23), who had himself travelled extensively in Germany, Gaul, Africa, and Spain, and also collected all the information he could from the work of other writers. His work, *Historia Naturalis*, contains accounts of Scandinavia, the course of the Niger, and Mt Atlas, as well as giving a clearer notion of the G. of Asia. His work was carried on by Claudius Ptolemaeus (c. AD 150), who verified the lat. and long. of the prin. places and corrected all estimates of distances.

Exploration and Cartography.—During the Middle Ages the knowledge of G. was submerged in the obscurity that overspread all science, but happily Ptolemy's works lived on in Islam. It was only when the journeys of Marco Polo (1271-1295), the Venetian explorer, in the Far E. had again aroused interest in the subject, and subsequent explorations had led to a knowledge of the extension of land from E. to W., that Ptolemy's works were

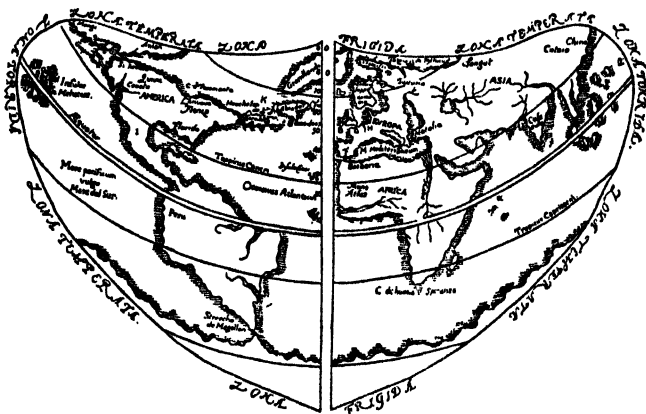
rescued from their obscurity and retranslated into Lat. (1410). The 15th cent. saw a great impetus given to geographical discovery. In 1486 Diaz discovered the Cape of Good Hope, while in 1497 Vasco da Gama doubled it and proceeded to India. In 1492 Columbus made his momentous voyage across the Atlantic and discovered America, and this feat was speedily followed by an exploration of the coasts of Africa, Asia, and America, while Magellan passed to the S. of America and succeeded in circumnavigating the globe. The rapidly accumulating mass of knowledge led to an improvement in the production of maps and to the development of the cartological side of G., the New World being first shown on Juan de la Cosa's map in 1500, while Mercator, in 1569, showed the world upon the system of projection which still bears his name. Ptolemy's work rapidly grew obsolete under such a wealth of discovery, and in 1524 Apian pub. his *Cosmographicus Liber*, basing it upon Ptolemy's system of mathematics and measurements, while Münster followed in 1544 with *Cosmographia Universalis*, which is a descriptive work containing an account of the manners of various peoples and the different industries. The next important book on G. was pub. by Varenus in 1650. He treated G. as a science, dealing with the form, dimensions, and substance of the earth, the distribution of water, mts, woods, deserts, and atmosphere, with the celestial properties, i.e. lat. and long., climatic zones, etc., while he gave only a secondary consideration to the human side of the science. He was not content with a mere narrative of phenomena, but sought for their explanation, and his system dominated G. for more than a century.

In the meantime geographical discovery had progressed on all sides. During the 16th cent. endeavours were made to discover a NW. passage to India, in which Frobisher, Davis, Hudson, and Baffin took part. Sir Humphrey Gilbert wrote a famous *Discourse*, 1576, arguing for the existence of such a passage. In the 17th cent. the Dutchmen, Tasman and Van Diemen, discovered Australia, and in the 18th cent. Capt. Cook reached New Zealand and discovered many of the Polynesian Is. (see TERRA AUSTRALIS INCOGNITA). During the same period cartography had also greatly improved owing to the use of better instruments, the introduction of the telescope, pendulum, barometer, and application of the system of triangulation, thus rendering possible the production of reliable maps. The method of showing heights by *contours* is due to Ph. Buache (1737), while *hachures* were devised by Lehman in 1799. The next important step in the hist. of scientific G. was made by the great Ger. philosopher, Immanuel Kant, who lectured on physical G. at Königsberg from 1765, and dealt with the subject under the 5 headings of (1) Mathematical G., including the form, size, and movements of the earth; (2) Moral G., the customs

of different races; (3) Political G., dealing with countries according to their govts.; (4) Mercantile G., the G. of commerce; (5) Theological G., the study of the various religions in its geographical aspect.

Geophysics.—The beginning of the 19th cent. led to the foundation of that branch of G. known as geophysics, due to the researches of Newton, Engler, Leibnitz, Laplace, and others upon the phenomena of gravitation, tides, and the earth's density, while geology was estab. by the investigations of Desmarest, Werner, and Hutton upon the nature of rocks and the shiftings due to volcanic disturbances and denudation. These researches were collated by Sir C. Lyell in his *Principles of*

the importance of comparative G. and endeavoured to show the effect of terrestrial relief and climate upon human hist. His colossal work, *Vergleichende Geographie*, begun in 1817, was never completed, only Asia and a portion of Africa being dealt with. He adopted the teleological argument of Christian theologians, and endeavoured to show that the earth had been created so as to meet the needs of mankind in every respect, and looked upon the arrangement of land and sea and the earth's configuration as instruments for guiding man along the line mapped out by divine providence. His bias in this direction led him to devote himself more closely to the historical aspect of G. The



SIR HUMPHREY GILBERT'S MAP
This map appeared in his *Discourse*, 1576.

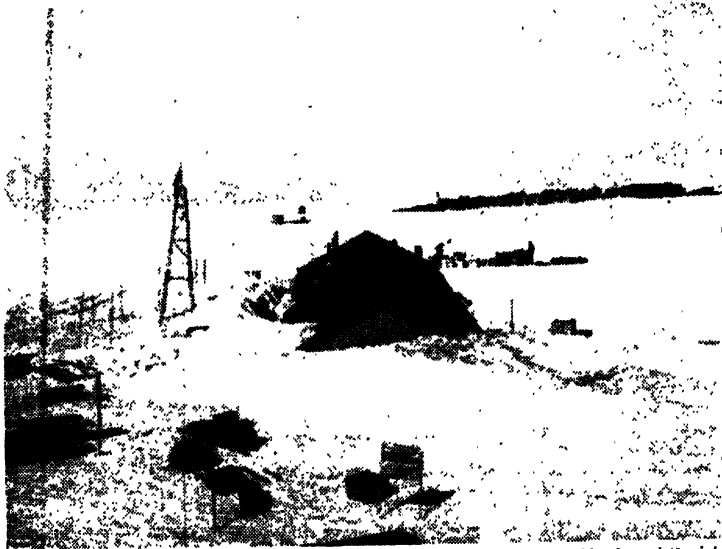
Geology, 1830-3. Botanical G. was promoted by the works of Linnaeus and the 2 Forsters, father and son, who accompanied Cook on his voyages and directly interested Alexander von Humboldt (1769-1859) in the study. Humboldt has many claims to be considered the greatest of all geographers. He was a great traveller and acquired a mass of first-hand knowledge as well as doing immense work in classifying the knowledge collected by others. He showed that the forms of land exercise a deciding influence upon climate and upon the plants and animals, including human races, that inhabit them. The results of his investigation were pub. in his great work *Kosmos*, 1845-58, which remains a classical work on G. He also introduced the use of isotherms and isobars, and by directing attention to the question of vertical relief and the mean height of countries he founded the science of geographical morphology. Humboldt was almost equalled in the immensity of his labours by his contemporary Karl Ritter (1779-1859), who laid stress upon

undue stress laid by Ritter upon the historical side was corrected by Peschel, who carried on Humboldt's work, and again brought into prominence the physical aspect of the science. His successors have more or less each presented their own personal point of view, devoting special attention to and bringing into special relief one particular aspect of the science. The evolutionary theory had necessarily a great effect upon the view of geographers, and led to the conception of the earth's origin and its gradual cooling through long geological ages, and the effect of its celestial environment upon the form assumed by land and water, thus serving to complete geographical knowledge and invest the subject with a new philosophical dignity.

Geographical Discoveries in the Nineteenth and Twentieth Centuries.—During the 19th cent. the work of geographical discovery went on unabated and many expeditions were sent forth. Amer., Eng., and Fr. expeditions under Wilkes, Ross, and d'Urville visited the Antarctic seas in 1840

and led to a whole series of similar expeditions. In 1880 Baron Nordenfjöld sailed round the N. of Europe and Asia. The interior of America was explored by Humboldt and others. Africa was penetrated by Bruce, Speke, Livingstone, Emin Pasha, Baker, and others. Sturt and Eyre explored the interior of Australia, while the continent was traversed from Melbourne to the Gulf of Carpentaria in 1860 by Burke and Wills. Among explorations interesting to note is

by Andrée, a Swedish engineer, who left Spitsbergen in a balloon with 2 companions in 1897 and was not heard of again till 1930, when his skeleton was discovered, with those of his companions; and by Scott in 1901 towards the S. pole. Prin. subsequent expeditions were those of Peary (N. pole, 1909), Amundsen (S. pole, 1911), Scott (S. pole, 1912), and Fuchs (trans-Antarctic crossing, 1957-8). In addition, sev. deep-sea explorations have been carried out by the Brit.



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THE ROYAL SOCIETY ANTARCTIC EXPEDITION, 1956-8

A general view of the base at Halley Bay, showing the main base hut and the dumps in the background

the journey of Prince Peter Kropotkin in the Trans-Baikal prov. of Siberia and N. Manchuria in 1864, which led to a new conception of the mt system of Asia. In 1871 Prjevalsky commenced his exploration of Tibet, in which he was followed by many Russian, Brit., and Fr. explorers. The last quarter of the 19th cent. also saw many important explorations in W. China, Indo-China, and Inner Asia. Between 1894 and 1897 Sven Hedin carried out some highly interesting explorations in the Pamir region, and on the N. boundary of Tibet, while the exploration of Africa is associated with the name of Stanley. Special attention has been given to the exploration of the Arctic and Antarctic regions and to the discovery of the poles. The chief expeditions were conducted by Nansen in 1895, who reached $86^{\circ}14'N.$; by the duke of Abruzzi in 1900 to $86^{\circ}33'N.$;

ships *Challenger* (see CHALLENGER EXPEDITION) and *Discovery I* and *Discovery II* (see DISCOVERY COMMITTEE), the Ger. *Valdivia*, and the U.S.A. steamer *Albatross*. See also OCEAN AND OCEANOGRAPHY. Of recent years much exploration and geographical survey work has been carried on by means of aeroplanes, while motor vehicles have been used in exploration of the Sahara (Haardt and Audouin-Dubreuil, 1923) and the Gobi desert (Andrews, 1928), etc. In 1926 Amundsen's dirigible *Norge* crossed the N. Pole on a flight from Spitsbergen to Alaska, and in 1928 he was lost on an expedition for the relief of the wrecked dirigible *Italia*. In that year useful observations on meteorological and navigation conditions were made by Capt. Sir Hubert Wilkins on a flight from Alaska to Dead Man's Is., Spitsbergen. In

Sept. 1936 the famous Fr. explorer, Jean-Baptiste Charcot (q.v.), was lost when the Fr. polar research ship *Pourquoi Pas* foundered off Iceland. In the same year a Soviet hydrographic expedition claimed to have mastered a new sea-route near the Nordenskiöld Archipelago. The Soviet Gov. estab. a polar station in the vicinity of the N. Pole in 1937, and Prof. Otto Schmidt headed a Soviet expedition in 1937-8. His report stated that the N. polar summer climate was considerably milder than was expected, and that the Polar Sea was more than 3000 ft deeper than Nansen's researches had seemed to indicate.

See ANTARCTIC EXPLORATION; ARCTIC EXPLORATION.

Modern Conception of Geography.—From the foregoing outline of the development of geographical knowledge it will be seen that the conception of G. has greatly altered from time to time, and can indeed be hardly said to be rigidly defined at present. In general G. may be said to be the study of the phenomena of the earth's surface and of its inhab. It can be divided into the following branches: (1) mathematical G., dealing with the figure and dimensions of the earth, its position relative to other celestial bodies, its movements as a planet and the effect of such movements upon its crust; (2) physical G., sometimes called physiography, dealing with the actual physical condition of the various portions of the earth's surface and capable of sub-divisions into geomorphology or the constitution of the lithosphere, oceanography, that of the sea, and climatology, the phenomena relating to the atmosphere; (3) biogeography, or the G. of animals (zoogeography) and of plants (phytogeography), the former including the study of mankind (anthropogeography), which is again divided into political and commercial G. according as the subject is treated from the point of view of the gov. or commerce of the country in question. The discussion of the relation of man to his environment is also known to-day as economic G., and the accepted basis upon which to found such discussion is a knowledge of the structure or 'build' of a country (*see below*). The elucidation of the many questions involved in the foregoing divs. leads to a study of the processes by which the present situations have arisen, which is termed historical G. or palaeogeography, a distinct subject from the hist. of G., which refers both to the hist. of the development of geographical ideas, a branch of the hist. of philosophy, and to the progress of actual geographical discovery, a branch of human hist. How far these branches are to be carried is not easy to determine. Mathematical G. borders upon mechanics, geomorphology is closely allied to geology, and biogeography leads naturally to biology. Another div. may be made between general G. and regional G., sometimes termed chorography, which is simply the application of geographical study to a limited area, and in its turn leads to topography, the description of a special place or

locality. For fuller information relating to any of these special branches the reader is referred to the various articles and to the books mentioned in the bibliography below.

Economic Geography and the 'Build' or Structure of a Country.—It is remarked above that a knowledge of the structure or build of a country is the best basis for discussing economic G. 'Build' is defined by Prof. Griffith Taylor as the essential geological pattern, whether anct shield, crustal trough (syncline), or ridge (anticline), raised relic of an old range or young mt, either with broad or narrow folds. This aspect of G. has been presented in the better text-books in Europe since 1910, but is by no means universally adopted in America. Its chief advantage, however, is that it enables us to account for the distributions of various commodities such as metals, coal, oil, or water-supply in a way impossible by any method which ignores structure. A study of structure or build shows, for example, that erosion is much more rapid on the exposed surfaces of mts and plateaux, with their swift rivs. and streams eating into the steep slopes, and that it is only when such land-forms are worn down to their roots to form peneplains that they become relatively stable. It tells us, too, that the most permanent portions of the earth's crust are the very anct land-surfaces known as coigns or shields. These shields flank the Atlantic and Arctic oceans, while the greatest elevations of to-day flank the Pacific and Indian oceans, and the most important shields occur in Brazil, E. Canada (the Laurentian), E. Siberia (Angara), Russia, and W. Africa. Many geologists believe that the tetrahedral earth-plan is a relic from the original cooling and contraction of the molten earth, and certainly the tetrahedral theory affords some explanation of the world-plan—the central Asiatic land-mass with the 3 great continental 'peninsulas,' America to the SE., Euro-Africa to the NE., and Australasia to the NW. (as shown on a form of polar projection with the N. Pole at the centre). The climatic arrangements of the world-plan are determined primarily by lat. and secondly by aspect. A study of the arrangement of the vegetation in the Amer. 'peninsula' shows that it is identical with that in Africa, except that the gulf of Mexico and the Caribbean Sea have very deeply embayed America on the tropic of Cancer. Again, such study serves to explain the remarkable monsoon climate for which India is noted; and again why there is always a belt of warm temperate forest and savanna about 500 m. wide on the E. or windward side of the desert belt which stretches from the Sahara almost to China. Early man, says Prof. Griffith Taylor, 'had no greater love for the desert or tundra than the average man of to-day. Hence his chief abiding places would be found in the belt between the desert and the forests. The park-land type of country, just on the drier edge of the forests, would seem to be best suited to early man. Probably the

primitive negroid peoples would prefer the warmer savanna woods, while the higher races would expand on the edge of the temperate forests. These belts would also be the great corridors of migration until man tamed cattle and horses, when the drier steppes would be equally available. With the use of bronze and iron tools, some progress would be made in cutting down the deciduous forests of the temperate zone, but as regards tropical forests, man has not even yet made much impression on them. . . . These belts of vegetation have varied in position during the life of man on the earth. Everyone knows of the swing from tropic to tropic of the sun during each half-year. The effect of this swing is first felt as a change of temp. and this brings about a similar seasonal swing in the wind-belts and also in the rain-belts. 'There is thus a direct connection between the change in a temp. belt and the change in a rainfall belt.' (Griffith Taylor, *Environment, Race, and Migration*, a valuable work on the 'fundamentals of human distribution,' pub. by Toronto Univ. in 1937.)

While it is thus evident that G. as a branch of knowledge is capable of progressive div. into various subsections, each of which can be treated in itself, it is nevertheless necessary to point out that the tendency is rather towards unification. This is due to the influence of Peschel and Ritter in Germany, whose views have gradually made their worth felt also in England and America. While the old system of G. as taught in schools consisted simply in treating each portion of the globe with reference to its physical, political and commercial features quite objectively without any special scheme or order, the modern system endeavours to show the immediate or underlying connection each geographical fact has with the pupil himself. Hence it is customary to begin with those geographical features which intimately concern the pupil, such as the surroundings of the class-room, thence to deal with the immediate vicinity, and afterwards to enlarge the scope of the study until it deals with the characteristics and interrelation of the general features of the earth's surface and their influence on mankind and animal and plant life, leading on to the reasons for the distribution of mankind in time and country and to the study of geographical hist. This new system of dealing with the subject has given G. a place among the highest branches of knowledge, and many univs. now have special profs. of G., and grant degrees in the subject. See also GEOLOGY; GEOPOLITICS; MAPS; METEOROLOGY; OCEANOGRAPHY.

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Geological Societies. The chief G. Society in Great Britain is the G. Society of London, founded in 1807 and incorporated in 1826 (address, Burlington House, London, W.1). Among foreign G. S. some of the prin. are the G. Society of America (New York), Société Géologique de France (Paris), and the Società Geologica Italiana (Rome). International Congresses of geology are held at intervals, the first having taken place at Paris in 1878. Much work of a G. nature is carried out by members of crystallographical, petrological, mineralogical, and palaeontographical societies, while smaller bodies (natural hist. societies, etc.) afford a focus for local activities.

Geological Survey. The G. S. of Great Britain is the oldest gov. G. S. in the world; it was estab. in 1835, in the first place as a branch of the Ordnance Survey, whose director at that time, Maj.-Gen. T. F. Colby, wished to see the topographic survey serve as a groundwork for geological and other surveys. Sir Henry de la Beche (q.v.) had already begun a survey of SW. England (1832) and had produced a G. map of Devon (1834) by his own efforts, though with some gov. support. In 1835 de la Beche was appointed the first director of the G. S. and remained in charge until his death in April 1855. During these 20 years this remarkable man estab. the G. S. as a separate institution in a building specially designed for it (almost certainly the first building after Greenwich Observatory

erected to house a scientific institution); founded the Museum of Practical Geology, now at S. Kensington; brought about the opening of the School of Mines to train geologists and mining men (now a part of the Imperial College of Science and Technology); and instituted a Mining Record Office to maintain records of mineral workings (now under the Home Office). The G. S. during de la Beche's directorship surveyed the W. half of England and Wales S. of the lat. of Liverpool, started to publish maps of Ireland, and began work in S. Scotland. Since that date the G. S. has continued with the primary G. S. of the Brit. Isles; England, Wales, Ireland, and the greater part of Scotland have been surveyed, mostly on a scale of 6 in. to a m., and maps of the geology have been pub. The Rep. of Ireland now has a separate G. S. Geological maps of the U.K. are pub. on the following scales by the G. S.: 25 m. to the in.; 10 m. to the in.; 4 m. to the in.; 1 m. to the in.; and, in economically important areas such as the coalfields, on a scale of 6 in. to a m. The smaller-scale maps are reduced from the surveyors' field maps, usually on a scale of 6 in. to a m. The originals may be consulted at the offices of the G. S. Memoirs describing the geology of the country shown on each 1 in. to a m. sheet are pub., as are special memoirs devoted to the economic resources of the country. These include pubs. on minerals and on water supply. Shorter accounts of local geology are provided in a series of regional guides. These form a series covering the whole country and probably form the best means of becoming acquainted with the geology of any part of the kingdom.

The work of the G. S. at the present day is largely concerned with economic matters, in particular with coalfields, underground water supply, and with fissionable materials required for the production of atomic energy. A special dept. has been formed to deal with the latter question and has extended its work outside the Brit. Isles. By Act of Parliament the G. S. is supplied with records of all wells over 50 ft deep, and must be informed in advance when such wells or bores are to be sunk. From such information and from the work of the surveyors, the G. S. has built up a quite unrivalled knowledge of the underground water-supply resources of the country. In addition to the work of immediate practical application, which covers many other spheres, among which may be mentioned the iron-ore fields, the oil shales, china clay, and many metallic and non-metallic minerals, the G. S. continues with its primary task of constant revision and improvement of the geological maps of the country, as a result of which new pubs. and maps are frequently issued. Geophysical methods have been introduced during the last decades to assist in this work. It is from the fundamental knowledge of the geology of a country gained in this way that a G. S. is able to answer the demands made for detailed and specialised information that arise

when new developments require the exploitation of new mineral resources. Thus during the last 2 wars advice was available on mineral deposits which might make good war-time shortages of imported material, just as advice was available on water-supply questions connected with the housing of large bodies of troops.

G. S.s are maintained in most countries of the world. Their functions are similar to that of the G. S. of Great Britain. The G. S.s in Brit. colonies, though usually financed by the countries concerned, are advised on certain matters by the directorate of colonial surveys, at the head of which is the G. S.'s adviser to the secretary of state for the colonies. This colonial G. S. service forms the second large G. S. organisation from Britain.

Location.—The museum (open to the public) and H.Q. of the G. S. of Great Britain are situated in Exhibition Road, South Kensington, London, S.W.7.

For the hist. of the G. S. of Great Britain see J. S. Flett, *The First Hundred Years of the Geological Survey of Great Britain*, 1937; E. B. Bailey, *Geological Survey of Great Britain*, 1952.

Geology (Gk *gê*, the earth; and *logos*, a discourse), the science dealing with the hist. of the earth from its creation to the present day. G. is concerned with the processes which operate on the earth, with the materials of which it is made and the way they are arranged, and with the sequence of events recorded by the rocks, including the appearance and evolution of living matter.

The prin. branches of G. are as follows: *physical G.* or the study of the surface of the earth and the processes which control its form; *petrology* or the study of rocks; *mineralogy* and *crystallography* dealing with minerals and crystals respectively. *Geochemistry* is concerned with the distribution of the elements through the earth and with the laws governing this distribution.

The study of the physical properties of the earth and of the forces which affect it is the field of *geophysics*. *Structural G.* deals with the structure of the earth and *stratigraphy* or *historical G.* with the historical record preserved in the rocks of the crust. *Geochronology* may be defined as the study of the absolute age of geological events in the hist. of the earth whether geological or archaeological. *Palaeontology* deals with the remains of plants and animals preserved in the rocks; *palaeobotany* is the branch of palaeontology concerned solely with fossil plants; *micropalaeontology* deals with the smaller forms of fossil life, principally with foraminifera, and *palaeoecology* is concerned with the habitat of fossil faunas and the influence of environment on life in the past. *Geomorphology* deals with land forms or the shape of land-masses at the present day; *oceanography* is the science of oceans. Both subjects are of great concern to the geologist, though they lie primarily in the field of the geographer.

The practical applications of G. have led to the study of *mining G.* or the study of mineral deposits and of the means by which they can be found; of *oil-field G.*, and of *engineering G.* The newly developed science of *soil mechanics* deals with the behaviour of unconsolidated material, such as sand or clay, under the various loads and conditions imposed by building and engineering works. Finally there is the work of the water-supply geologist, concerned with the distribution and use of underground water, or *hydrogeology*.

History of Geology.—Although geological phenomena were described by the ancients from time to time, particularly when their effect on mankind was catastrophic, as was, for example, the eruption of Vesuvius in AD 79 which destroyed Pompeii, G. as a science dates at the earliest from the Renaissance. One must not forget, however, the empirical knowledge shown by the mining operations of the Egyptians and Romans. Leonardo da Vinci (q.v.) observed fossil sea shells in the interior of Italy, recognised them for what they were, and deduced correctly that the rocks containing the fossils had been deposited below the sea and subsequently uplifted to form dry land. The drawings of da Vinci show that he was observing and recording such matters as the folds formed in rocks during mt building in a manner that has only become general at the present day. About the middle of the 18th cent. Lehmann (d. 1767) demonstrated that there was a succession of rocks recording a succession of geological events and thus laid the foundations of stratigraphy. Lehmann introduced the term Primary to distinguish the earliest rocks from those of the Secondary group which he recognised as having formed from layers of debris washed from the Primary group. Fuchsel, working in the same period as Lehmann, introduced the term stratum to describe one layer or bed of the Secondary deposits. The origin of the sedimentary rocks was thus clearly estab. Early in the 19th cent. Wm Smith (q.v.), 'the father of English geology,' took the next step when he showed that sedimentary rocks could be arranged in a definite sequence, that the oldest rocks lay at the bottom, and that each layer could be identified by the fossils it contained. In the meantime Abraham Werner (1749-1817) put forward the notion that all rocks originated in the ocean, an idea which the work of the Scotsman James Hutton (q.v.) (1726-97) finally demolished, when he showed that certain rocks were igneous and had cooled from a melt. These are the volcanic rocks such as the lavas, of which basalt is an example, and the intrusive or plutonic igneous rocks of which granite is the most familiar. Volcanic rocks cool on or near the surface, and plutonic rocks consolidate deep within the crust.

Hutton was the first to realise that the rocks, whether they were sedimentary or igneous, originated through processes

which are operating at the present time, such as the accumulation of sand on a sea-shore, or the outpouring of lava from a volcano. Hutton realised that the long geological record of the past could be interpreted through an understanding of the present, and was not the result of extraordinary events, unknown at the present time, as the 'Catastrophic' school would have it. The appearance in the years 1830-3 of *Principles of Geology* by Sir Charles Lyell (q.v.) estab. the validity of Huttonian ideas with a wealth of evidence which was immediately accepted. Lyell's clear exposition of the fundamental geological ideas to be found in this book may be said to open a period of research which has continued to the present day. Darwin (q.v.) has recorded his debt to this book, which he took with him on his voyage in the *Beagle*; it was, indeed, at Lyell's instigation that Darwin first set out the views on evolution which eventually appeared in 1859 in his *Origin of Species*. While palaeontological and stratigraphical knowledge was greatly advanced during the first half of the 19th cent., the study of petrology lagged until the use of the microscope for the examination of thin sections of rock, first employed by Henry Clifton Sorby (1826-1908), became general and until the chemical analysis of rocks and minerals began to be practised. During the present century our understanding of rocks formed at high temps. and pressures has been increased by laboratory experiments on rock melts subjected to such physical conditions as might be expected deep in the crust of the earth. The investigations in the Geophysical Laboratory in Washington have been pre-eminent in this field. To-day geochemical and geophysical work on such topics as the distribution of elements through masses of rock, their abundance in the crust, and on the physical properties of the crust play an increasing part in petrology.

Perhaps the most peculiarly geological line of enquiry is the making of the geological map. Such a map shows the nature of the underlying rock, the attitude of the beds or of the margins of the igneous rocks, together with details of other features which it may be particularly desired to record, such as the mineralisation, the structure, or the degree of alteration or of metamorphism, etc. The first map of Britain was made by Wm Smith and was pub. in 1815 as his 'Geological Map of England and Wales.' Since that date geological surveys have been estab. in practically every country, beginning with the creation of the official geological survey of Great Britain in 1835 with de la Beche (q.v.) (1796-1855) as the first member of its staff. The task of geological survey is to prepare geological maps, to collect information about the geological resources of the ter., and to publish the knowledge so gained. See GEOLOGICAL SURVEY.

Practical applications of Geology.—The work of the geologist is often of direct concern to the community. Although

the mining of coal and metallic ores has been practised for many more centuries than has the science of G., the modern expansion of the mining industries results directly from the ability of the geologist to locate new mineral resources. At the present day much of the surface of the earth has been so intensively explored that it is increasingly probable that few unworked reserves remain to be found near the surface. The geologist has developed methods of prospecting at depth in co-operation with the geophysicist, who determines the underground distribution of the rocks from measurements of local variations in the gravitational and magnetic fields of the earth and from a form of echo sounding which involves the measurement of shock waves from explosions reflected back to the surface by the underlying rocks. In recent years delicate tests for exceedingly small amounts of elements (a few parts per million) have been devised. These can be used to find minute concentrations of useful elements in plants, soils, or running water, which in turn may lead one back to the mineral deposit from which they have been derived. In this fashion mineral deposits, of which no other sign exists at the surface, have been located.

The search for oil has depended entirely on scientific prospecting, for oil lies within the crust as pools in the pore spaces of folded sedimentary rocks. In order to obtain the oil it is often necessary to determine the geological structure to a depth of sev. m. below the surface. A knowledge of the underground structure plays an important part also in determining the distribution of the underground water which supplies our wells. A successful well must not only enter a water-bearing rock, but one which is capable of yielding that water. Water present in fine textured rock such as clay is held so tightly that it does not readily leave the rock, which is said to be impermeable. Ideally, a well should reach water in a readily permeable rock such as a sand or gravel, which is lying below the permanent water table—the level at which water lies within the earth. The height of a water table depends on many geological conditions which are only sufficiently understood when a large area of the surrounding country has been geologically mapped. Geological maps also provide immediately useful information by showing the location of sources of lime, of sand and gravel, and of brick clays, etc., and by showing the nature of the underlying rock and thus enabling the agriculturist and the engineer to assess the probable suitability of a given dist. for farming and civil engineering works in so far as these are affected by the soil and the drainage, or availability of water. Such an assessment involves the interpretation of the geological map, a task for which some geological training is necessary; this raises the question of how the geologist works and how geological investigations are carried out in the field.

The geological method.—The oldest rocks are believed to have formed 3,500,000,000 years ago. The geologist has to interpret the record left in the crust of events occurring from that time to the present. The passage of geological time can be measured conveniently by the principle employed in the hr glass. In that instrument the rate at which sand passes is known and hence the amount that has passed to the lower chamber provides a measurement of time. Salt is accumulating in the oceans and has been through geological time; hence, since the total of salt in the seas can be computed, an estimate of the time it has been accumulating can be obtained provided the rate at which it accumulates can be found. Estimates of the age of the earth have been actually made on this basis, but to-day these are superseded by determinations based on the study of the radioactive decay of minerals. Radioactive isotopes break down at a constant rate and give rise to new isotopes. Thus an isotope of lead arises through the decay of uranium. It is possible to calculate the length of time this process has been operating, and thus the age of the mineral and rock in which it occurs, once the amounts of 2 isotopes have been determined. In this way estimates of absolute age have been estab. throughout the geological column. In the rocks formed during the last 500,000,000 years, that is to say since the Cambrian, fossils may be found. By the application of Wm Smith's law successions of strata have been estab. and have been correlated or equated from one locality to another when identical fossils occur in both places. In this way it has been possible to subdivide the rocks, placing those with similar faunas together and arranging each group in its correct chronological position in the geological column.

The nature of the rocks from places within this column indicates the kind of event which was taking place on the earth at that locality when the rock was laid down; thus desert deposits such as sand dunes indicate dry land, marine clays demonstrate that the locality lay below the sea, while volcanic rocks show that volcanoes were active nearby. By applying the doctrine of Uniformitarianism, as Hutton and Lyell first appreciated, we can interpret the past in terms of the present. Thus the study of the geomorphology and physical G. of the earth of to-day throws light on the nature of the earth in the past.

The attitude of the rocks as well as their nature throws light on their hist. If highly folded rocks are abruptly covered by flat unfolded rocks it is clear that the first group were folded at some period before the latter were deposited, and we have evidence of a period of folding which may be recognised in other areas as having taken place at the same geological time. In this way the existence of an old mt chain of folded rocks may be estab. even though all trace of the higher parts of the mts has been removed by erosion.

(4. is concerned not only with the past but also with the interior of the earth separated from our eyes not by time but by space. The geologist builds up a picture of the deeper parts of the earth in the following ways.

Inspection of rocks which have been deeply buried—in some instances it can be demonstrated by as much as 15 km. of rock—and which have been brought back to view by the erosion of the overlying rocks shows what the crystalline rocks below the surface at the present day are likely to be. These expectations can be confirmed by drilling, though to a limited



TALUS FORMED BY ACTION OF FROST,
NIPIGON RIVER, ONTARIO

extent, as the really deep drills, which approach 5 km. in length, are in the unmetamorphosed sedimentary rocks of the oilfields of the world. Such evidence shows that continents consist of thin veneers of superficial deposits such as boulder clay left by ice or the deposits of rivers, which overlie sequences of sedimentary rocks lying in huge depressions in the crust or in troughs or basins a few km. deep but up to several hundred km. in breadth. Below these basins are the crystalline rocks made up of the 2 groups of metamorphic rocks which once were sedimentary or volcanic and the intrusive igneous rocks of which granite is the most abundant. At depth the 2 groups become more and more intermingled and form extensive areas of mixed rocks or migmatites made up of granite and metamorphic rock intimately intermixed.

Over much of the earth at the present day the sedimentary cover is lacking and the crystalline rocks are exposed to view.

This is so over much of Canada in the Canadian or Laurentian Shield made up from pre-Cambrian rocks of different ages, most of which have been deeply buried since they were formed and slowly brought back to view by long, continued erosion. In Britain most of the SE. of the country is underlain by sedimentary rocks formed during the Tertiary and Mesozoic, while the older rocks are seen in the N. and the W. In the extreme NW. of Scotland the pre-Cambrian crystalline migmatitic rocks formed 1,200,000,000 years ago, together with those of even older periods, are seen in the Lewisian gneisses. Geophysical evidence suggests that each continent is underlain by a mass of rocks such as have been mentioned to a depth of some 35 km. Below this the thickness may be greater. Below this continental mass the material becomes more dense rather rapidly. This discontinuity is the Mohorovicic discontinuity which separates the crust from the underlying layer termed the mantle. The mantle extends to 2900 km., where there is another break and the core is reached.

The core is more dense than the mantle and has some of the properties of a liquid. Our knowledge of it comes from a consideration of the weight of the earth, which is so great as to demonstrate that the deepest parts must be much more dense than any rock in the crust, and from a study of the way in which shock waves set up by earthquakes travel through the earth. There is an important distinction between the rocks below a continent and those underlying an ocean. It has long been known that granites are unknown from the is. in the central Pacific and over much of the other oceans, whereas, as has been shown, granite is common below continents. Geophysical evidence suggests that the granitic or Sialic layer (named after silica and aluminium, the 2 main constituents after oxygen) which makes up the continental crust is either absent or but a few km. thick below the oceans, where the Mohorovicic discontinuity occurs but 10 or so km. below sea-level. As the ocean waters are some 4 to 5 km. deep, the total rock above the Mohorovicic line is very much less than the 35 km. of Sial under the continents. The latter, in fact, appear to be rafts of matter with a density of about 2.8 floating on material of density 3.4 approximately which occurs everywhere below the Mohorovicic and which is believed to be peridotitic in composition, that is to say rich in silica and magnesia and thus termed Sima. The higher level of the continents as compared with the ocean depths follows from this density difference of the underlying rock. The denser rock near the ocean bed can buoy up a greater thickness of the lighter subcontinental material, in the same way as the denser sea-water supports an iceberg. Realisation of this fact is expressed in the notion of isostasy.

See also PHYSICAL GEOLOGY, and articles on the different members of the

geological column, the prin. divs. of which are as follows:

Quaternary	Recent
	Pleistocene
Cainozoic or Tertiary	Pliocene
	Miocene
	Oligocene
	Eocene
Mesozoic or Secondary	Cretaceous
	Jurassic
	Triassic
	Rhaetic
	Permian
	Carboniferous
Palaeozoic or Primary	Devonian
	Silurian
	Ordovician
	Cambrian
Pre-Cambrian	

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Geomagnetism, or terrestrial magnetism, the magnetic properties possessed by the earth as a whole. The effective and practical study of G. in England is chiefly associated with the name of Edmund (or Edmund) Halley (q.v.), the astronomer, though the attraction of iron by loadstone was known to antiquity, and is mentioned by Plato and later writers. In our time the study has been pursued by Crichton Mitchell, and, before him, by Hellmann and Sylvanus Thompson. While still at St Paul's School Halley decided to devote his life to astronomy, but G. was his chosen secondary interest. In 1672, when only 16 years of age, he measured the magnetic declination (q.v.) in London. At Oxford he planned an expedition across

the equator to observe the S. stars, and in 1678 he was enabled, through the Royal Society, to go to St Helena, where he observed the magnetic declination. The Royal Society pub. his famous theory of the distribution of the declination in 1683. He suggested that 'the whole earth is one great magnet, having four magnetic poles, or points of attraction, near each pole of the equator two, and that, in those parts of the world which lie near adjacent to any one of these magnetic poles, the needle is governed thereby, the nearest pole being always predominant over the more remote.' In 1692 he extended his theory to explain the secular variation, the whole period of which he conjectured to be '700 years or thereabouts.' We now know that, despite the irregular distribution of the earth's magnetic field, there are only 2 magnetic poles, to which converge all the magnetic meridians, and Halley's own later knowledge would have enabled him to draw many of these meridians and to discover the fact. The first actual chart of the earth's magnetic meridians was made in 1817 by Thomas Yeates. The causes of the main field, of its irregularities, and of its secular variations are still unknown. In 1698 Halley was granted a ship by William III 'to improve the knowledge of the longitude and variations of the compass.' After a magnetic survey of the N. and S. Atlantic he returned in 1700, and next year pub. his first chart of the declination over the Atlantic. In 1702, having collected further observations by mariners in other oceans, he produced a world magnetic chart. These charts are his greatest contributions to G., and give the declination in a way very convenient to navigators. In time, as he foresaw, their practical value came to an end, owing to the secular magnetic variation, but the value of his observations as a record of the declination at the epoch 1700 remains unimpaired. One remarkable gap in his geomagnetic work was his apparent total neglect of the magnetic dip or inclination, and this in spite of the importance already given by Wm Gilbert to the phenomenon in his book *De Magnete*, 1600. For 2 centuries Halley had no comparable successor in this sphere, and the magnetic survey of the globe was not renewed with his zeal until in 1905 young American, Louis Bauer, with the support of Carnegie, resumed the task. See also MAGNETISM. See A. Crichton Mitchell, *Terrestrial Magnetism*, 1932; E. F. MacPike (ed.), *Correspondence and Papers of Edmund Halley*, 1932; S. Chapman and J. Bartels, *Geomagnetism*, 1940; S. Chapman, *The Earth's Magnetism*, 1951.

Geometric Mean, see MEAN.

Geometric Progression, series of quantities such that the ratio of any one of them to the one immediately preceding is the same throughout the series. This ratio is called the common ratio of the series. Thus 3, 6, 12, 24 . . . etc.; 6, - 2, $\frac{1}{2}$, - $\frac{1}{4}$. . . etc.; and a , ar , ar^2 , ar^3 . . . etc. are

series in G. P., whose common ratios are respectively 2, $-\frac{1}{2}$, and r . In the last series the n th term is ar^{n-1} and the sum of

$$\frac{1-r^n}{1-r}$$

less than 1, it is found that the sum of an infinite number of terms of the series is the

finite quantity $\frac{a}{1-r}$, because $r^n \rightarrow 0$ when

n is infinite. A recurring decimal is an example of such a G. P., and is hence reduced to its equivalent fraction. Thus $0.\dot{7} = 0.777 \dots ad inf. = x$ say. Hence $7.777 \dots ad inf. = 10x$ and subtracting x from $10x$ and $0.777 \dots$ from $7.777 \dots$

$9x = 7$, or $x = \frac{7}{9}$. G. P. forms the basis

on which calculations of annuities and compound interest are made. See also MEAN.

Geometries, Finite, name given a class of G., in each of which there is a finite number of elements called *points*, falling into subsets called *lines*. The mutual relations between lines and points are closely analogous to those of lines and objects in ordinary projective geometry. See O. Veblen and J. W. Young, *Projective Geometry*, vol. 1, 1910, vol. 2, 1918, Boston, U.S.A.

Geometry may be defined as the investigation of the properties of space.

Historical.—As the name implies, its origin may be traced to what was necessary for the management of land. The frequent inundations of the Nile in Egypt destroyed landmarks, and so altered the value of land that the priests were driven to invent some method for finding areas. The first known attempt to classify these results was by a priest Ahmes in the 'Rhind' papyrus, which is at present in the Brit. Museum. For the historical development of G. see MATHEMATICS.

Elementary Pure Geometry embraces roughly the ground covered by Euclid's *Elements*, which forms an ordinary school course in plane and solid G. The latter treats of the ordinary space in which we move and is termed three-dimensional. A plane is two-dimensional, the upward direction out of the plane or third dimension being ignored. Similarly, a line is of one dimension, the direction sideways out of the line, in addition, being ignored. A point has no dimensions. The terms length, breadth, and thickness are popularly ascribed to the three dimensions. The conception of some unknown fourth dimension has occupied much attention, but that is hardly within the scope of the present discussion. It is sufficient to say that the algebraical methods of analytical G. can be applied to some extent to problems in four dimensions. Euclid's *Elements* filled 13 books, of which numbers VII to X, dealing with arithmetical and irrational quantities, and parts of XI, XII, XIII, dealing generally with solid G., are not usually read. Of the rest, Book I deals with lines and angles, finishing with certain propositions on areas; Book II

deals entirely with the areas of squares and rectangles; Book III with circles; Book IV with polygons; Book V is an introduction on proportion to Book VI, which deals with ratios. The retained parts of Books XI and XII deal with elementary properties of solid G. The whole series of propositions is based on certain assumptions and definitions. Euclid divided the assumptions into 2 parts. The first part contained what are now known as axioms 1 to 9; the second part, axioms 10 to 12 and the 3 postulates. An *axiom* may be defined as a self-evident truth, incapable of proof, which serves as a basis for future reasoning. Without some such assumptions no G. is possible, but there is much doubt as to exactly what may be justifiably assumed. Euclid has been criticised for making further assumptions in his propositions which are not mentioned initially in his list, and for mixing certain axioms with his definitions. What is now the 12th axiom, in particular, on which proof of theorems on parallel lines is based, is unsatisfactory, and in most modern eds. has been replaced by what is known as Playfair's axiom, but this, though more fundamental, is still open to some objections. The present method is to divide the assumptions into axioms and *postulates*, the latter being what must be necessarily assumed in construction, but it is questionable whether this is an improvement or not.

Until the beginning of the century the selected part of Euclid's *Elements* was universally accepted in almost its original form as a school text-book, and although it is not used now, those at present in use are little more than revised eds. A few propositions have been entirely omitted, the order has been altered in places, and some new methods have been introduced. There is no doubt that the alterations constitute a definite improvement. The new methods are worthy of notice. The idea of a locus is introduced, that is, of the path of a moving point. A circle is defined as 'the figure enclosed by a line traced out by a point which moves in such a way as to be always a given distance from a certain fixed point.' The principle of applying one figure to another is extended, and the *hypothetical construction* is introduced. It is assumed as axiomatic that a perpendicular can be drawn on a line from a point within it, a finite straight line bisected at a point, and an angle bisected by a straight line; whereas Euclid never used any one of these for a proof until he had found a method for its construction. The order of his propositions suffers in consequence, and some proofs are unnecessarily long. Thus Euclid, I. 5, the proposition known as the *Pons asinorum*, because its length made it a serious difficulty presented to the beginner, is now comparatively simple. The method of proof known as the *Reductio ad absurdum*, which Euclid often used, is still retained. It occurs principally in *converse* propositions, but is not confined to these. In

such a proof what is to be proved is assumed wrong and an obvious absurdity deduced. This absurdity occurs in every case but the one to be proved, and hence the proof is established.

Euclid's solid *G*, is of a very elementary nature, and is confined to a few propositions on planes and lines (which follow at once from the methods of plane *G.*), and on simple solids, including the 5 regular polyhedra. It is obviously impossible to deal with the propositions in detail here,

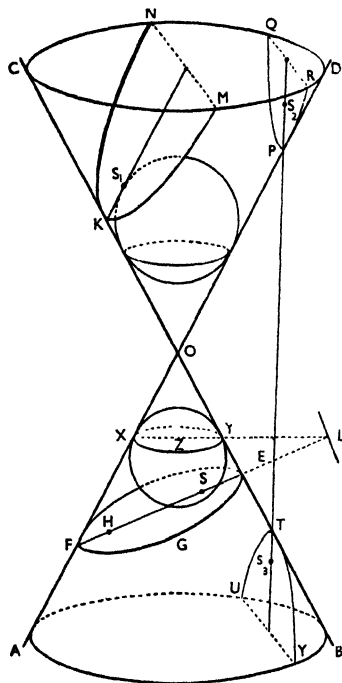


FIG. 1. CONIC SECTIONS

and the student must be referred to the many school text-books.

Higher Pure Geometry.—On finishing the ordinary school course the student is usually introduced to the *conic sections*, (Fig. 1), and though these curves are generally best treated by the methods of projective *G.* a description here is advisable. As the name implies, they are the curves obtained by cutting a right circular cone by planes. When the cutting plane makes an angle with the base of the cone less than that made by a generating line (*AD* and *BC* are called generating lines), the resulting curve is called an ellipse (in the figure *EGF*). When the cutting plane is

parallel to a generating line, the curve is a parabola (*NKM* in the figure), and when it makes a greater angle with the base than with a generating line, the curve is an hyperbola (*QPR* and *UTF* in the figure). It is best explained here that the geometrical conception of a cone differs from the popular conception in that it is produced on the other side of the vertex *O*. Hence there are always 2 branches of an hyperbola. A particular form of hyperbola is 2 straight lines when the cutting plane passes through *O*. Similarly, a circle is a particular case of an ellipse, and is the resulting curve when the cutting plane is parallel to the base. A sphere may be inscribed in the cone to touch the plane of the ellipse at the point *S* called the *focus*, and it can be proved that any point on the ellipse is such that its distance from *S* is in a fixed ratio to its distance from the straight line *L* called the *directrix* (the intersection of the planes *EEG* and *XYZ*). The same is true for a

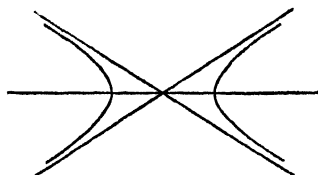


FIG. 2. ASYMPTOTES

second focus *H*, where another inscribed sphere touches the planes from below. The 2 foci (*S₂* and *S₃*) of the hyperbola and the 1 focus (*S₁*) of the parabola may be similarly found, and the same properties are true for these points. Thus a conic may also be defined as the locus of a point which moves so that its distance from a fixed point bears a constant ratio to its distance from a fixed straight line, the conic being an ellipse, parabola, or hyperbola, according as the ratio is less than, equal to, or greater than unity. The point midway between the 2 foci of an ellipse or an hyperbola is called the *centre*, and these are known as *central* conics. The extreme importance of the geometrical properties of these curves may be gathered on realising that planets and satellites move in orbits which are ellipses, and comets (q.v.) in orbits which are ellipses or hyperbolas. Further, apart from questions of friction with the air, any body freely projected from the earth moves in practically a parabolic path in its flight from the point of projection until it returns to the earth, though to be strictly accurate this path is an arc of a very elongated ellipse, one focus of which is at the earth's centre. It may be mentioned also that as an hyperbola recedes from the centre it gradually approaches 2 lines known as its *asymptotes*, which pass through the centre and are tangents to the curve at points infinitely distant (Fig. 2). Most properties of

conics may be conveniently obtained by projective methods.

Projective Geometry.—Let π and π' be 2 planes (Fig. 3) inclined at any angle, and let O be any point outside both planes. If A is a point in the plane π and the line OA cuts the plane π' in A' , the point A' is called the projection of A on the plane π' . If B is another point on the plane π and OB cuts the plane π' in B' , the point B' is the projection of B on that plane, and so on. Obviously every point on AB is projected into corresponding points on the plane π' , so that a line is projected into another line and a triangle, such as ABC , into another triangle $A'B'C'$. The point O is called the *vertex* or *centre of projection*, the plane π' intersecting the plane π along the line XYZ is called the plane of projection, and the line XYZ is called the *axis of projection* or *perspective*.

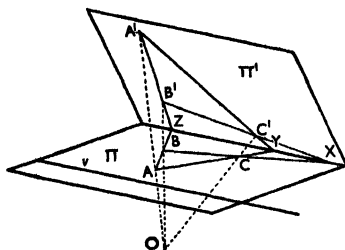


FIG. 3. PROJECTION

The triangle ABC (or any other figure) may also be regarded as the projection of the triangle $A'B'C'$ on the other plane, and the triangles (or any other figures) are said to correspond. Many theorems in projection are so obvious that proofs are unnecessary, amongst which are the following:

Any plane curve is projected into a curve of the same degree.

A tangent to a curve projects into a tangent to the projected curve.

Every point on the axis of projection projects into itself.

Corresponding lines intersect on the axis of projection. Thus the lines AB and $A'B'$, BC and $B'C'$, AC and $A'C'$, meet at the points Z , X , and Y respectively, these 3 points lying on the axis of projection.

The relation of pole and polar (q.v.) with respect to a conic is unaltered by projection.

If through the centre of projection O straight lines be drawn to the points lying at an infinite distance on the plane π , these straight lines will lie in a plane through O parallel to the plane π' . The intersection of this plane with the plane π will be a straight line V parallel to XYZ , the axis of projection. We can regard v as the projection of a straight line v' (not shown in the diagram) which contains all

the points at infinity on the plane π' . In the circumstances v' is called the *vanishing point* of the plane.

In all the cases just considered the centre of projection O is at a finite distance, and the projection is known as *conical*. If, however, the axis of projection is at infinity, in which case the planes π and π' are obviously parallel and the centre of projection O is at infinity, the projection is known as *parallel*, and in the circumstances parallel lines are projected into parallel lines and the ratio of segments of parallel lines remains unaltered in projection. If the projecting lines are at right angles to π' , the plane of projection, the projection is known as *orthogonal*.

For further information on the subject special treatises should be consulted. See works on *Conic Sections*, such as Charles Smith's, chapter XIV; G. M. Minchin and J. B. Dale, *Mathematical Drawing*, chapter IV; Arthur Cookshott and F. B. Walters, *A Treatise on Geometrical Conics*, 'Orthogonal Projections.'

Non-Euclidean Geometry.—The theory of parallels in Euclid's 12th axiom did not appear to be self-evident to the successors of Euclid, and non-Euclidean G. arose from attempts to improve this theory. Although a number of mathematicians had worked on the subject before Gauss (q.v.), it seems probable that he was the first to recognise the possibility of the falsity of this axiom. The names of Gauss, Lobachevsky, and Bolyai (qq.v.) are associated in the subject, but it was not known till after the death of Gauss in 1855 that he had been interested in it for many years. Lobachevsky was the first to publish a non-Euclidean G., about 1830, and in 1831 John Bolyai, a Hungarian mathematician, pub. an appendix to one of his father's treatises, in which he presented a non-Euclidean system of G. similar to that of Lobachevsky. In 1854 Riemann delivered his famous lecture 'On the Hypotheses which form the Foundation of Geometry,' which was pub. 13 years later. Expanding the ideas of Bolyai and Lobachevsky, he developed the conception of a space capable of any number of dimensions (which he described in terms of 'manifolds'), measurements of curvature and of finite but unbounded space. Only one kind of space—now known as hyperbolic space—was dealt with by Gauss, Lobachevsky and Bolyai, but some time after the appearance of Riemann's lecture it was shown that there were also 2 kinds of Riemannian space to which the names elliptical and spherical were given. Einstein's fundamental assumption, which can be expressed in the form that Euclidean G. ceases to be valid in a space where masses exerting gravitational forces are present, is dealt with elsewhere. (See EINSTEIN; RELATIVITY.)

Analytical Geometry differs from pure G. in that problems are solved by algebraical methods. It necessarily enables solutions to be found in certain cases where the methods of pure G. are much

less convenient. This branch of the subject is also known under the heading *co-ordinate geometry*, since the position of a point is determined by its co-ordinates or distances from certain fixed axes. In its most elementary form it is familiar to most under the name *graphs*. The student first learns to plot the position of a point with reference to 2 fixed perpendicular axes (in plane G.). By measuring a distance 4 units along Ox and then 3 units parallel to Oy , the point A is obtained (Fig. 3). It is said to be the point (4, 3) or the point $x = 4, y = 3$. The first of the 2 co-ordinates is known as the *abscissa*, and the second is the *ordinate*. If the first number is negative it is measured in direction Ox . If the y co-ordinate is negative, it is measured along Oy . Hence B, C , and D are respectively the points $(-4, 3)$ $(-4, -3)$ $(4, -3)$. Now consider the equation $3x + 4y = 12$. It is possible to find any number of sets of value for x and y to satisfy the equation. Take each pair of values in turn and plot out the corresponding point on the graph, and it will be found that all these points lie on a straight line. $3x + 4y = 12$ is then said to be the *equation of the straight line*. In a similar way it is found that every equation of the first degree in x and y represents a straight line. It obviously follows that a set of values for x and y which satisfies 2 such equations at once must represent the point of intersection of the 2 lines. Hence the algebraical solution of 2 equations gives the co-ordinates of the point of intersection of the lines they represent. By similar methods the loci corresponding to equations of the second degree in x and y may be traced, and the algebraical solution of any pair of equations gives sets of values for x and y which represent the points of intersection of the loci. Such is the practical beginning of co-ordinate G. It may easily be estab. that a straight line must be represented by some equation of the first degree, that the straight line $Ax + By + C = 0$ cuts the axes in points

$(-\frac{C}{A}, 0)$ and $(0, -\frac{C}{B})$, that it makes an

angle $\tan^{-1}(-\frac{A}{B})$ with the axis of x , and

so on. Various formulae are developed for the distance between 2 points, the distance from a point to a line, the angle between 2 straight lines, and so on. A corresponding list of formulae may also be found for *oblique* axes, that is, where the original axes are taken inclined at an angle ω instead of a right angle, and the co-ordinates are measured parallel to the axes.

The method of representing a point by its distance measured parallel to axes is known as the *Cartesian* method. Any point may also be represented by the distance OP and the angle POM , better known as the *polar* co-ordinates. The connection between the 2 systems may easily be seen from Fig. 4 to be $x = r \cos \theta$

and $y = r \sin \theta$, and hence the polar equation of any locus may be deduced from the Cartesian equation, and vice-versa.

In Cartesian a circle of centre (h, k) and radius a has an equation $(x-h)^2 + (y-k)^2 = a^2$, and where the point O (the origin) is the centre, this becomes $x^2 + y^2 = a^2$. From the locus definition of a circle its general equation is found to be of the form $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ (where $a = b$ and $h = 0$; a, b, c , etc., are constants), i.e. of the second degree; when the axes are suitably chosen, an ellipse, parabola, and hyperbola (q.v.) may respectively be represented by

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \quad y^2 = 4ax, \quad \text{and} \quad y^2 = 1.$$

From these equations series

of formulae may be formed for tangents and normals at any point, the polar of a given point, and so on, and thus the G. of conics may be treated from an algebraical

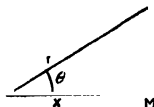


FIG. 4. POLAR CO-ORDINATES

point of view. Equations of the third and fourth degree in x and y , which result in more complicated curves, may be treated in a similar way.

Solid Geometry is in many respects analogous with plane G. A third axis Oz is taken perpendicular to the plane containing Ox and Oy , and a point thus has 3 Cartesian co-ordinates x, y , and z . The equation $Ax + By + Cz + D = 0$ of the first degree now represents a plane. A straight line is the intersection of 2 planes, and hence is represented by 2 equations of the first degree. There are other ways of representing the equations of a straight line: thus if it passes through 2 given points (α, β, γ) and $(\alpha', \beta', \gamma')$ the

equations are $\frac{x-\alpha}{\alpha'-\alpha} = \frac{y-\beta}{\beta'-\beta} = \frac{z-\gamma}{\gamma'-\gamma}$, or

if l, m, n are the direction cosines of the line, $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n} = r$, where r is the distance

between the points (x, y, z) and (α, β, γ) . The 3 polar co-ordinates (r, θ, ϕ) are connected with x, y , and z by the equations $x = r \cos \phi \cos \theta, y = r \cos \phi \sin \theta$, and $z = r \sin \phi$ (Fig. 5). In Cartesian, the equation of a sphere of centre (h, k, l) and radius a is $(x-h)^2 + (y-k)^2 + (z-l)^2 = a^2$, and when O is the centre the equation is

$x^2 + y^2 + z^2 = a^2$. The general equation of the second degree is a solid of which all plane sections are conics and is called a *conicoid*. A particular case is the

ellipsoid, whose equation is $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

From these equations formulae for tangent planes, normals, etc., are developed very much as in plane G. Many solid G. methods are, in fact, analogous with those of plane G., and many of the simpler surfaces may be derived from conics. Thus surfaces of revolution are obtained by revolving some plane curve about an axis in the same plane. The *hyperboloid of two sheets* and an *elliptic paraboloid*, for example, may be generated by the motion of a variable ellipse and a parabola respectively, and finally the

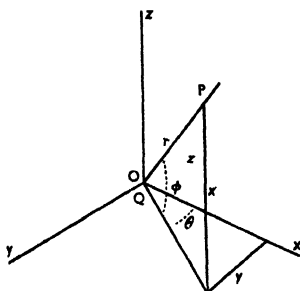


FIG. 5. SOLID GEOMETRY

hyperboloid of one sheet, the *hyperbolic paraboloid*, the cone and the cylinder, and others known as *ruled surfaces* may be generated by the motion of a straight curve. A curve in space may be represented by 2 equations, and hence the properties of such a curve are obtained by expressing the 3 co-ordinates as functions of a single variable. Such a curve is treated as a polygon, whose sides are indefinitely small. The place of any 2 consecutive sides does not in general contain the next consecutive side. These are called *tortuous curves*. By supposing x, y, z, w to be the 4 co-ordinates of a point in 4 dimensions, a similar series of results may be obtained. See articles under individual subjects and names, and DIMENSION. See E. H. Askwith, *Course of Pure Geometry*, 1921; E. E. Tweedy, *Junior Geometry*, 1928; and I. Todhunter (ed.), *The Elements of Euclid*, 1862 (Everyman's Library, 1933). For plane analytical G. the student may be referred to H. J. Smith, *Co-ordinate Geometry* (for elementary work), and A. Clement-Jones, *Introduction to Algebraic Geometry*; for solid G. to P. Frost, *Solid Geometry*, 1875; G. Salmon, *Analytic Geometry of Three Dimensions*, 1862; A. R. Forsyth, *Geometry of Four Dimensions*, 1930;

D. M. Y. Somerville, *Analytical Geometry of Three Dimensions*, 1934; and A. Robson, *An Introduction to Analytical Geometry*, 1940.

Geonim, see GAON.

Geophysical Year, International, July 1957 to Dec. 1958, during which period observations of the action of natural physical forces on the earth were made by scientists from some 40 countries at many places throughout the world. At the time chosen for the observations, solar activity would be at or near its maximum. Temporary observation stations were set up to study geophysical phenomena in the fields of astronomy, scientific radio, geodesy and geophysics, pure and applied physics, and meteorology. Specific subjects for study included Antarctica, long- and lat. determinations, the aurora, etc. Brit. contributions included the setting up of many stations in the U.K. and the Commonwealth, observations from weather ships, and an Antarctic expedition (see FUCHS). Rockets were used to obtain information about the upper atmosphere at heights up to or beyond 120 m.: by Mar. 1958 both the U.S.S.R. and U.S.A. had launched earth satellites equipped with instruments to radio information back to observation stations on the ground. See ROCKETS AND SPACE TRAVEL; SATELLITE.

Geophysics, see GEOGRAPHY; PHYSICAL CONSTANTS.

Geopolitics, modern version of political geography, or anthropogeography. As such, though not novel, it has accumulated a respectable amount of scientific material. In its political aspect it served as a weapon of modern National Socialism, a rationalising ideology of imperialist expansion. It is this aspect of G. which has naturally aroused wide interest and no little misunderstanding. Regarded as a world outlook, G. is a comprehensive *Weltanschauung*, which has fired the imagination and gained the loyalty of a small yet significant group of enthusiastic adherents. This latter is the least discussed side of G., but is probably the most crucial, for it explains the appeal of this pseudo-science to immature and susceptible minds and also indicates clearly its power and danger. The difficulty of analysing G. arises from the fact that the scientific and political aspects are inextricably intermingled in the minds of its advocates and enemies alike. Used by the Ger. publicists to justify the moral basis of *Lebensraum* (q.v.), *Geopolitik*, in the hands of Prof.-Gen. K. Haushofer, became a new fashion, which soon raised its chief exponent to the role of 'the man behind Hitler.' But Haushofer's definition of G. as 'a study of the dependence of political events on the character of the earth' was not his invention, though it seems to imply some novelty; and little that was added to it by his Institut für Geopolitik will survive criticism. The significance of political geography was recognised as long ago as the time of Herodotus and Thucydides. Rodin and Montesquieu, Ranke, and Ritter all showed conclusively the importance of climate and environment

in the hist. of mankind. Dietrich von Bülow's *Spirit of the New System of War*, 1799, is a study in geopolitical vein. That the geographical approach to hist. and politics was well estab. long before the emergence of *Geopolitik* may be seen from the pages of H. T. Buckle, Taine, and particularly Treitschke, the historian of the Bismarckian age, and Otto Hintze, master of Prussian hist., whose discussion of the antithesis between the political destiny of the democratic is., Britain, and that of Prussia, the militant continental state encircled by competing land powers, has long been an accepted textbook on the Continent. The later development of the study of G. came with Friedrich Ratzel, who expounded the first great scientific theory of the environmental basis of society, and Rudolf Kjellén, who popularised Ratzel's writings. All this material provided a working basis for the wider investigation of G. in the period following the First World War; and while no doubt the Haushofer school was greatly indebted to this pre-existing material, even on an elementary plane, it contributed to the revitalisation of the collated factual data, and, of course, in Germany it awakened a wider interest in climate, natural resources, configuration, and topography considered primarily in terms of strategy. After the days of Ratzel's *Scarcen Laws of Expansionism* G. built up an imposing catalogue of rules and concepts. Many of them are but platitudes or half truths, though obscured in a flashy journalistic terminology, which makes works on G. difficult reading for the uninitiated; but in these voluminous utterances are sometimes implied genuine realities, which should not be lightly dismissed merely because they have been applied unscrupulously for political ends. Exponents of *Geopolitik* seized, after Versailles, on the idea of 'space-conquering forces' (borrowed from Ratzel), and claimed that *Geopolitik* was the liberator from prov. nationalism and the expression of a still inarticulate longing for a new world order. It may be noted here that the Ger. geopolitical school was officially launched in 1924, the year in which Germany overcame inflation, and its inauguration heralded the dawn of a new imperialism, accompanied by the resuscitation of such aspirations as the *Drang nach Osten*. From Kjellén's *Realpolitik*, too, Haushofer's school learned that if G. was to become a lodestar of a synthetic science the idea of a state must be widened far beyond the merely legal concept. Sir Halford Mackinder's doctrine of land power—a corrective of Mahan's thesis as expounded in his *Geographical Pivot of History*, 1904—conceived world politics as essentially a conflict between oceanic and continental powers. His *Democratic Ideals*, 1919, was an unheeded yet salutary warning against the emergence of a land bloc that would prove invulnerable to sea power. It was reiterated at the time of the Versailles peace conference, but the system as dictated by the great powers in the Versailles Treaty neg-

lected the potentialities of such great compact land masses. Haushofer's doctrine has been well described as 'Mackinder in a strait jacket.' It was on its use as a political weapon that the *Geopolitik* of Haushofer's school of fanatic disciples won historical significance. See S. Neumann, 'Fashions in Space,' in *Foreign Affairs*, vol. xxi, No. 2; R. Hennig, *Geopolitik, die Lehre vom Staat als Lebewesen*, 1928; O. Maull, *Das Wesen der Geopolitik*, 1936; S. von Valkenburg, *Elements of Political Geography*, 1939; J. H. G. Lebon, *Introduction to Human Geography*, 1952; and bibliography of GEOGRAPHY.

Geoponoi, name given to various (Gk and Rom. writers on agriculture, also known as *Scriptores rei rusticae*. The Alexandrian writers were great compilers of treatises on agriculture, *Geoponika*, which were used by later writers, such as Cassianus Bassus, who wrote at the end of the 6th cent. AD. A main source from which such compilations were made was that of Mago of Carthage, frequently condensed and trans. Cato the Elder wrote a practical treatise, *De Agricultura*, of which parts survive; but the chief authorities, still full of useful advice and of inestimable value for knowledge of past systems of farming, are the *Libri Tres Rerum Rusticarum* of M. Terentius Varro, and the *De Re Rustica* of Columella, from which Palladius compiled his work in the 4th cent. AD.

George, St, patron of England, a martyr who suffered at Lydda in Palestine, probably under Diocletian. Though venerated from very early times in the E., his W. cult received powerful influence from the crusaders. The legends connected with his name are fictitious. His figure as the model of knighthood and avenger of women may be due to the fact that near Lydda was the mythical site of Andromeda's rescue by Perseus (q.v.). His feast is on 23 April.

George I (George Louis) (1660-1727), king of Great Britain and Ireland, son of Ernest Augustus, afterwards elector of Hanover. He married his cousin, Sophia Dorothea of Zell (or Celle), who in 1694 was divorced by him because of her alleged misconduct with Count Königsmark. The latter was assassinated and Sophia remained imprisoned until her death in 1726. The mother of G. was Sophia, the granddaughter of James I, and although the possibility of succession to the Eng. throne seemed remote, the stipulation of Protestant succession gave the succession to the Hanoverian line by the Act of Settlement, 1701. During the war of the Sp. Succession G. sent forces to the allies at Blenheim and made a strong alliance with Marlborough. In 1714 the death of his mother (Sophia) and of Queen Anne laid the way open for his succession to the Eng. Crown. The intrigues of Bolingbroke were unsuccessful, owing to the sudden death of the queen. G. was proclaimed king and came immediately to England. His succession may be regarded as the final

step in the Protestant revolution, and the stability of his crown may be gauged from the utter failure of the Jacobite rebellion of 1715. G. understood no English while his ministers did not understand German, hence his presence at cabinet meetings was futile, and the effective gov. was carried out by a prime minister (Walpole). G. apparently regarded England merely as a great country of which he was the nominal ruler, and which was to raise the prestige of Hanover and fill his pockets and the pockets of his Ger. followers with Eng. gold. G. d. at Osnabrück and was buried at Hanover. See J. McCarthy, *A History of the Four Georges*, 1905; L. Melville, *The First George in Hanover and England*, 1908; J. F. Chance, *George I and the Northern War: a Study of British-Hanoverian Policy, 1709-21*, 1909; and Sir H. M. I. Terry, *A Constitutional King—George the First*, 1927.

George II (George Augustus) (1683-1760), king of Great Britain and Ireland, only son of George I, succeeded to the throne in 1727. In 1705 he married Caroline Wilhelmina of Anspach. In 1707 he was created earl of Cambridge, and in 1708 he was present at Oudenarde. During his father's reign he was on bad terms with the king the greater part of the time. Bad feeling between father and son seems to have been one of the Hanoverian hereditary qualities. During the greater part of the reign of George I he was regarded as the official centre of the opposition, and Walpole (q.v.) expected dismissal when George I d. But through the influence of Queen Caroline he was soon reinstated, and received the loyal support of the king until his resignation. G. was a man with the coarse character and meticulous habits of a drill sergeant of his age. He was a man of method, very economical and with a prodigious memory. The politics of the greater part of his reign were quiet. Walpole gave the country a much-needed peace, but in 1737 Caroline d. and, with her influence removed, matters became much more difficult for Walpole. He resigned in 1742. G., like his father, recognised Hanover as the dearer of his 2 possessions. That G. did not lack military skill or courage is obvious from his presence and victory at Dettingen (1745). The importance of the reign lies to a great extent in the fact that G. in practice, if not in theory, played the part of a constitutional monarch. The rebellion of 1745 proved that personal loyalty to the Hanoverian succession was not yet a factor in practical politics, and that the Protestant Ger. succession was to a very great extent regarded as a business transaction. The traditional bad feeling between the king and the heir apparent was maintained by the conduct of G. and Frederick, prince of Wales (d. 1751). G. himself d. in the middle of the Seven Years War. See R. Walpole, *Memoirs of the Reign of King George II* (ed. Lord Holland), 1846; Lord Herve, *Memoirs of the Reign of George II, from his accession to the death of Queen Caroline*, 3 vols., 1884; R. J. Lucas, *George*

II and his Ministers, 1910; and L. B. Namier, *The Structure of English Politics at the Accession of George III*, 1929.

George III (George Frederick William) (1738-1820), king of Great Britain and Ireland, son of Frederick, prince of Wales, and grandson of George II, whom he succeeded in 1760. After the death of his father he was educ. chiefly under the care of the dowager princess of Wales (his mother) and the earl of Bute (q.v.). The lines of his education decided his policy as a king, and he was educ. chiefly, at least in policy, on the lines of the *Patriot King*, a book written by Bolingbroke (q.v.). G. became imbued with the idea that the great work of his life must be the re-establishment of the power of the Crown in practice, as well as in theory, to the position it had held under the Stuarts. G.'s mind had, as prince of Wales, been set against the system by which the king had come to choose his ministers from that party which was most powerful in Parliament, although, as recent historical research has shown, this practice had been modified by a good deal of manipulation from behind the scenes by court interests even during his predecessors' reigns. G.'s greatest innovation was, probably, his open declarations of his intention to choose his ministers as he pleased. He endeavoured to regulate affairs by means of the party known as the King's Friends.

His first choice as prime minister, the earl of Bute, was particularly unfortunate, but Bute retired early in 1763, and did not again return to office. On the Amer. question which led to the War of Independence G. was almost certainly honest in his inability to see anything unconstitutional in the attitude which he adopted towards the Amer. colonists. In this he was very largely at one with the nation; the nation as a whole was just as stubborn as G. Why the Americans should not contribute to the cost of a war which had been fought in their defence, and why it was unconstitutional for Parliament to levy taxes on the Amer. colonies, were 2 points which the king and the nation could not understand. The king chose his own minister (Lord North) and plunged into the war, believing that it was a justifiable one, and certainly never entertaining any doubt but that the result would be victory. The disasters of the war found him unmoved; the coalition of France, Spain, and America failed to open his eyes to the danger. He later declared that he had fought the Amer. colonies because he believed that the Amer. colonies were in the wrong, and he fought right to the end: he was the last to give in to the opening of the negotiations for peace.

The peace of Versailles (1783) gave America her independence, but gave England better terms than had at one time seemed possible, since the victories of Rodney and the Fr. and Sp. failures had strengthened her hand. The whole struggle, however, is illustrative of the fact that England was plunged into a world war, in which she lost a great deal

of her prestige, largely because of G.'s obstinacy. Rockingham, whom events had forced G. to accept as prime minister, although he was a Whig, *d.* in 1783, and was succeeded by Lord Shelburne, whose short-lived ministry was overthrown by a coalition of Fox and North. The coalition ministry took office only in turn to be dismissed when their India Bill was rejected by the Lords. The king then sent for Wm Pitt. On the surface, at any rate, the king had triumphed; he had overthrown the coalition, and he had appointed his own minister: the influence of the Crown was apparently restored. Pitt, without a majority of the House of Commons to support him, had been appointed minister, and was supported by the influence of the Crown until finally, 2 months later, a dissolution and general election returned a majority in favour of the king and his minister. The dissolution was the work of the Crown entirely, but the country supported the king and Pitt, and from the moment that a majority of the House of Commons gave their adherence to Pitt it may be said that his period of office became constitutional.

In 1788 G.'s mental instability, which had been increasing for some time, became acute. During this period of insanity the regency question was debated in the House of Commons, and Pitt was probably only saved from dismissal by the recovery of the king. The thanksgiving service which the king attended in 1789 was one great ovation for the king himself, and the outbreak of the revolution in France did much to increase his popularity. He was regarded as the centre of all opposition to the Fr. and to the ideals which the revolutionaries put forward. Probably his quiet home life and the purity of his family life had much to do with his popularity, and it should be remembered that in most of his policies which have subsequently been most criticised G. had the bulk of the nation behind him. The next great political question which arose was the question of Catholic emancipation. The Act of Union (1801) had been accompanied by a promise of relief to the Catholics. Pitt's proposals were brought to the ears of the king, and he rejected them entirely, declaring that his honour and his coronation oath were at stake. Pitt resigned, but the attitude of the king was approved and supported by the vast majority of the nation. Addington succeeded Pitt, and retained office until the outbreak of war, when Pitt again came into office. The king's attacks of insanity were now becoming much more frequent. G.'s personal reign really closed in 1811, when his reason finally failed him. He lived on for 9 years, blind and insane. To his people G. was a generally popular king, especially in his

and had 9 sons and 6 daughters. The death of his youngest daughter, the Princess Amelia, in 1810 brought on the final attack of insanity, from which he never recovered. His eldest son, George, was appointed regent until his father's death in 1820. See W. Donne (ed.), *Correspondence of George III with Lord North*, 1867; L. Melville, *Farmer George*, 1907; B. Wilson, *George III, as Man, Monarch, and Statesman*, 1907; Sir G. O. Trevelyan, *George III and Charles Fox*, 1912; L. B. Namier, *The Structure of English Politics at the Accession of George III*, 1929, and *England in the Age of the American Revolution*, 1930; lives by J. D. G. Davies, 1936, and C. E. Vulliamy, 1937; H. Butterfield, *George III, Lord North, and the People, 1779-80*, 1948, and *George III and the Historians*, 1957.

George IV (George Augustus Frederick) (1762-1830), king of Great Britain and Ireland, eldest son of George III, *b.* St James's Palace. He grew up to be exceedingly well gifted and exceptionally handsome. The strictness and seclusion of his home life helped to drive him to a life of extravagance and profligacy, and he plunged heavily into the gay life of London society and had a succession of mistresses. Gradually he became more and more estranged from the king, the profligacy of his life and his early political associates, Fox and Sheridan, both Whigs, helping to widen the breach. In 1783, having come of age, he was given a separate estab. at Carlton House, his debts were paid, and he was granted £50,000 per annum from the Civil List. Shortly after his coming of age he fell in love with a beautiful Catholic widow, Maria Fitzherbert (q.v.), who had been married twice before she met the prince. Marriage with her was impossible under the Act of Settlement of 1689, and further, the Royal Marriage Act of 1772 forbade any marriage without the knowledge of the king. She refused to contemplate becoming the mistress of G., and finally, in 1785, they were married by a clergyman of the Eng. Church. This marriage was acknowledged secretly by his friends and denied openly for political reasons. Their relations were broken off for a time in 1795, but soon renewed, and seem to have ended finally about 1803, though G. acknowledged her as his wife in name until 1811. In 1795 the prince married a Ger. Protestant princess, Caroline of Brunswick. After the birth of the Princess Charlotte, their only child, the couple separated. The position of the prince soon became very important in view of his father's increasing mental instability (1788). He and his friends claimed that he had the right of becoming regent without the consent of Parliament, but the Regency Bill only provided for his appointment with certain restrictions. G.'s first regency was short, but from 1811 until his father's death he was regent continuously, becoming known as the 'Prince Regent.' His treatment of his wife, his extravagance, and his loose living, especially at a time of almost

devotion, and his own marked ability, were the prejudices and virtues of the Eng. nation of the 18th cent. He married in 1761 Charlotte Sophia of Mecklenburg-Strelitz,

universal distress, made him exceedingly unpopular in the country. His appearance in the streets of London was a sign for outburst of hissings, and in 1817 he was stoned on his way to open Parliament. In 1820 he succeeded his father, and immediately plunged into a public quarrel with his discarded wife. Her name left out of the Prayer Book, her title withheld, and her honour doubted, she came to England to enforce her claims. Already the king had tried to divorce her; now she was accused of adultery. But

1817. She had married Leopold of Saxe-Coburg in the previous year. See R. Huish, *Memoirs of George the Fourth*, 1830; R. Grenville, duke of Buckingham, *Memoirs of the Court of England during the Regency, 1811-20*, 1856, and *Memoirs of the Court of George IV*, 2 vols., 1859; J. Creston, *The Regent and his Daughter*, 1932; and a life by R. Fulford, 1935, enlarged edition, 1949.

George V (George Frederick Ernest Albert) (1865-1936), king of Great Britain, Ireland, and the Brit. dominions



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KING GEORGE V MAKING A CHRISTMAS BROADCAST FROM SANDRINGHAM

the Bill to deprive her of her royal position failed; and throughout the proceedings public sympathy for Caroline was obvious. The disowned queen tried to force her way into the abbey during the coronation proceedings, failed, and retired to die in the Aug. of 1821. The king visited Ireland and Scotland during the early days of his reign, and his popularity there was greater than in England. Though he reigned for 10 years, he exercised no great influence on public affairs, although as he grew older his personal views on politics became increasingly reactionary, and as a ruler he was most unpopular. He was, however, an extravagantly generous patron of the arts and is famous as the creator of Brighton as a fashionable resort. His only child, the Princess Charlotte, d. in

beyond the seas, emperor of India, second son of King Edward VII, was b. at Marlborough House, London. In 1877 he and his brother, the duke of Clarence, became naval cadets. Two years later they cruised to the West Indies in H.M.S. *Bacchante*, and in the following year they made a more prolonged cruise in the same ship. Prince G. was intended to remain in the naval service; for that reason he was appointed to H.M.S. *Canada* in the North Amer. and West Indian station, and became a sub-lieutenant. In 1885, after a course at the Royal Naval College at Greenwich, he became a lieutenant; and in 1889 he commanded a torpedo boat in the naval manoeuvres. In 1890 he commanded the gunboat H.M.S. *Thrush*; but in 1892 he relinquished his commission in the navy on becoming heir apparent

through the death of the duke of Clarence. In the same year he was created duke of York; on 6 July 1893 he married the Princess Victoria Mary of Teck. The duke and duchess visited Australia in 1901 to open the first Federal Parliament. They visited during the return journey South Africa and Canada. In Nov. 1901 the duke was created Prince of Wales. He succeeded his father 6 May 1910 as George V. He was crowned 22 June 1911; and at the end of that year he visited India, being the first Brit. emperor to do so. At his coronation Durbar at Delhi, the transference of the Indian cap. to that place was announced. In July 1914 he called a conference at Buckingham Palace of all Brit. and Irish parties to attempt a settlement of the Ulster difficulty, but no solution was found. During the First World War he frequently visited the W. Front, and at home he and his wife gave up much of their time to visiting factories, hospitals, etc. On 17 July 1917 he proclaimed an alteration in the style of the royal house: in future to be known as 'of Windsor'—all Ger. titles having been renounced. On 22 June 1921, at Belfast, he inaugurated the Parliament of Northern Ireland. He visited Belgium again in May 1922; in May 1923 he visited Rome, and was received by the pope. In April 1924 he opened the Brit. Empire Exhibition at Wembley; on 19 July of the same year he was present at the consecration of Liverpool Cathedral. In the spring of 1925 he was absent from the kingdom sev. weeks, on a health-cruise in the Mediterranean. At the end of Nov. 1928 he fell seriously ill with pleurisy, underwent an operation, and was in so grave a condition that councillors of state were nominated, and all members of the royal family summoned to Buckingham Palace; but he made a good recovery, and in Feb. 1929 was able to go to Bognor to recuperate. He did not resume opening Parliament in person until 28 Oct. 1930. In the period of social and economic turmoil which followed the First World War the popularity of the throne and personal affection for the king and queen steadily increased, as was shown by the public anxiety displayed during the king's illness in 1928, the unprecedented enthusiasm which marked his silver jubilee in May 1935, and the universal grief which followed his death on 20 Jan. 1936 at Sandringham. His quiet dignity, happy family life, and obviously sincere interest in his subjects gave him a unique position among his people. In 1932 he first broadcast a Christmas message to the nation, a practice continued by his son and granddaughter, and characteristic of G.'s desire to be in close touch with the people. Some of the most important events of his reign, apart from the First World War, were the extension of the franchise to women, the estab. of the Irish Free State (1922), the formation of the first Labour Gov. (1924), the General Strike (1926), the economic crisis (1931), and the introduction of the new Indian

constitution. George VI on 22 Oct. 1947 unveiled the statue of his father which is part of the national memorial. The statue stands in the grounds of Westminster Abbey, exactly opposite the entrance to the House of Lords, and is the work of Sir Wm Reid Dick. *See also* KING GEORGE'S FIELDS FOUNDATION. He had 5 sons—Edward (b. 1894), who succeeded him as Edward VIII; Albert (1895–1952), who became George VI; Henry (b. 1900), duke of Gloucester; George (1902–42), duke of Kent; and John (1905–19). There was 1 daughter, Mary (b. 1897), the Princess Royal, later Countess of Harewood. *See* J. Buchan, *The King's Grace*, 1935; life by A. Bryant, 1936; and J. Gore, *King George V: a Personal Memoir*, 1941.

George VI (Albert Frederick Arthur George) (1895–1952), king of Great Britain, Ireland, and the Brit. dominions beyond the seas (the title 'Emperor of India' was dropped from the royal style in 1947 on the passing of the Indian Independence Act of that year); b. 15 Dec. 1895 at York Cottage, Sandringham; second son of George V. He was educ. at the Royal Naval College, Osborne, and Trinity College, Cambridge, and was present at the battle of Jutland, 1916. G. was created Baron Killarney, earl of Inverness, and duke of York, 3 June 1920. He married Elizabeth Angela Marguerite (q.v.), daughter of the earl of Strathmore, on 26 April 1923 at Westminster Abbey, and in the next few years the duke and duchess of York made sev. official visits abroad, including visits to East Africa, the West Indies, Australia, and New Zealand. On the abdication of his brother, Edward VIII (q.v.), he succeeded to the throne on 10 Dec. 1936. His coronation took place at Westminster Abbey on 12 May 1937. Through their strongly democratic appeal the king and queen soon won great popularity, besides restoring the prestige of the Crown. G. himself was distinguished by a kind and unceremonial manner, and a high sense of duty. With the queen he made a 7-week tour of Canada, the U.S.A., and Newfoundland in May and June 1939, meeting with a memorable popular reception. He was the first reigning Brit. sovereign to visit America. For the first time in hist. he performed royal functions in a dominion, appearing in the Canadian Parliament, giving the royal assent to Bills, receiving the U.S.A. minister to Canada for the delivery of his credentials, and signing the Canadian-Amer. treaty of commerce.

Early in the Second World War G. visited the Brit. Army in France (4–10 Dec. 1939). Throughout the war he shared the common suffering of his people; always interested in industry, he paid numerous visits to factories, shipyards, and docks. The king and queen remained in London even though Buckingham Palace itself was damaged by air-raids. They made many visits to severely bombed areas in London, and to all the great prov. cities which had been

attacked. G. visited Malta (20 June 1943) to convey his appreciation of the fortitude of the Maltese during their long ordeal, including this in his fortnight's visit to the Brit. armies in North Africa. He visited Eisenhower's H.Q. in Normandy, 1944, only 10 days after D-Day, and later visited the It. front and the newly-liberated Channel Is. He took the salute of the Victory Parade in the Mall (5 June 1946). With the queen and the 2 princesses he sailed in H.M.S. *Vanguard* on the first visit of a reigning monarch to South Africa, arriving in



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KING GEORGE VI

Feb. 1947, and returning to England in May. A further tour to Australia and New Zealand was planned for the spring of 1949, but it was cancelled owing to the illness of the king, who underwent an operation in Mar. 1949 for the relief of an affection of the right leg. His recovery appeared to be complete, and in 1951 he opened the Festival of Britain. Later that year, however, he underwent another serious operation. His elder daughter and her husband increasingly attended public functions in his place, and the king's frailty was apparent.

On 6 Feb. 1952 G. d. suddenly at Sandringham, to the nation's widespread grief. He had struggled all his life against ill-health. Naturally shy and reserved, his sincerity and sympathetic interest in his people had made him loved and respected throughout the Commonwealth. He and Queen Elizabeth had 2

daughters: (1) Princess Elizabeth Alexandra Mary, duchess of Edinburgh (b. 21 April 1926), who succeeded him as sovereign, and (2) Princess Margaret Rose (b. 21 Aug. 1930).

George I (1845-1913), king of the Hellenes, b. Copenhagen, the 2nd son of King Christian IX of Denmark. On the Gk throne falling vacant at the expulsion of King Otto in 1862 he was recognised by the powers and elected king of the Hellenes in 1863, resigning his right of succession to the throne of Denmark. In 1867 he married Olga, grand duchess of Russia. He was one of the prin. engineers of the Balkan League formed in 1912, and directed against Turkey. He was assassinated in Salonica, and succeeded by his son, Constantine (q.v.).

George II (1890-1947), king of the Hellenes, b. Tatol near Athens; eldest son of King Constantine, on whose first deposition he was excluded from succession on account of his pro-Ger. sympathies, his younger brother Alexander succeeding. Alexander dying in 1920, and the restored Constantine being again deposed, G. succeeded Sept. 1922. His first gov. was Republican in sympathy, its leading figures being Venizelist (see VENIZELLOS) generals. A group of Royalist generals tried unsuccessfully to overthrow the gov. by force, and G., being implicated, was deposed and banished, while Greece was proclaimed a rep. (Mar. 1924). In 1935 a plebiscite produced an overwhelming majority in favour of G.'s return, and he returned to Athens for the second time as king. Soon afterwards Metaxas (q.v.), a leader of the Royalist party, became, in effect, dictator, abolished the constitution, dissolved Parliament, and claimed royal authority for his new regime. When Mussolini attacked Greece (April 1941) G. and Metaxas declared war on the Allies' side, but when the Germans invaded Greece the Greeks were defeated, and G. left the country for honourable exile as the head of his occupied state. When the war ended, however, the country was in a virtual state of civil war, and Archbishop Damaskinos was appointed regent. Eventually the Royalists gained power, and in 1946 a plebiscite once again resulted in a clear majority in favour of G.'s return. G., however, d. suddenly only a few months after his second return to Greece, and was succeeded by his brother, Paul (q.v.).

George V (1819-78), king of Hanover (1851-66), only son of Ernest Augustus, king of Hanover and duke of Cumberland, and grandson of George III of England, b. Berlin. He became blind in 1833. His illiberal views made him extremely unpopular, and when in 1866 Prussia annexed Hanover G. had few supporters left. The king made many unsuccessful attempts at restoration, and d. while on a visit to Paris. His remains are buried in St George's Chapel, Windsor.

George, D. Lloyd-, see LLOYD-GEORGE.
George, Sir Ernest, R.A. (1839-1922), architect, b. London; started practice 1861. His work consisted mainly of

large country-houses, and of tn-houses in West London, e.g. Mount Street and Collingham Gardens. He favoured a picturesque Flem. style, and used terracotta largely for facing tn-houses. He also designed the Royal Academy of Music. He was a competent artist in water-colour. He was president R.I.B.A. 1908-10 and Royal Gold Medallist 1896. Among many famous architects who worked as his assistants were Sir E. Lutyens (q.v.), Sir H. Baker (q.v.), and Sir Guy Dawber.

George, Henry (1839-97), Amer. economist, b. Philadelphia. He left school at an early age in order to support himself, and first went to sea. He afterwards learned the trade of printing, and in 1858 worked his way to California, where he became a journeyman printer. He was, however, soon obliged to leave this trade, owing to its depression, and for the next few years he drifted from one employment to another. In 1865 he began to write for the press, and became a reporter on the *San Francisco Times*, where he rapidly obtained promotion. His most important work, *Progress and Poverty*, was first pub. in 1879, and in a few years obtained great popularity; and, by 1883, G. found himself regarded as the apostle of a new social creed. He wrote numerous articles for magazines, and papers on economic and political subjects, but his literary activities brought him little pecuniary return, and he remained in poor circumstances till his death. See life by his son, Henry, 1900 (also included in G.'s collected works, 1906-11); also A. N. Young, *History of the Single Tax Movement in the United States*, 1916; and J. R. Commons and others, *History of Labour in the United States*, 1918.

George, Stefan (1868-1933), Ger. poet, b. Büdesheim, near Bingen. In 1892 he founded the far-famed *Blätter für die Kunst*, aimed at reforming the Ger. language. He gathered round him an exclusive circle (*George-Kreis*), who were destined to have a profound influence on Ger. and even European intellectual life. His first poetry especially is akin to the Fr. symbolists in its aloofness and imagery: *Hymnen*, 1890, *Jahr der Seele*, 1897, *Teppich des Lebens*, 1899. In his later poems he is more aware of the cultural task of the poet in society, but he continues to stress spiritual over social values: *Der siebente Ring*, 1907, *Der Stern des Bundes*, 1914, *Das neue Reich*, 1928. He also pub. many trans. and adaptations from Mallarmé, Rimbaud, Shakespeare, and Dante. His complete works were pub. in 18 vols., 1927-34. See studies by F. Gundolf, 1921; H. Benrath, 1936; E. G. Winkler, 1937; C. David, 1952; also F. Wolters, *Stefan George und die Blätter für die Kunst*, 1930.

George, Walter Goodall (1858-1943), athlete, b. Calne, Wilts. He was the winner of the record number of 12 Amateur Athletic Association championships, and his time for the m.—4 min. 12½ sec.—stood as the world's record for 37 years.

The amateur championships he won were the m. and 4 m., each 4 times, and the ½ m. and 10 m. each twice. He turned professional in 1884, and his famous record in the m. was made against W. Cummings of Paisley at Lillie Bridge in 1886. In 1882 and 1884 he also won the national cross-country titles. In all he won more than 1000 cups and medals. Although Bannister, Ibbotson, and others have done the m. in under 4 min., G. had not the same advantages from artificial aids; he had little help from the trainer, he had no masseur, tracks were slow and badly laid, and there was no scientific dieting. See *ATHLETICS*.

George, tn in Cape Province (q.v.), South Africa, named after King George III, and described by Anthony Trollope (q.v.) as 'the prettiest village in the world; at least the prettiest I have ever seen.' G. is the seat of an Anglican bishop.

George, Lake: 1. Lake in the E. part of the state of New York, U.S.A., in the Adirondack Mts, connected with Lake Champlain by Ticonderoga Creek, and famed for beautiful scenery, which makes it a favourite summer resort. It is about 33 m. long, and from 1 to 3 m. wide, and is fed by brooks and springs.

2. Lake in New South Wales, Australia, 25 m. SW. of Goulburn. It is a salt-water lake, 25 m. long and 8 m. broad, and is 2129 ft above the level of the sea.

3. Lake in Uganda, formerly known as Albert Edward Nyanza.

George Cross, honour instituted in 1940 to reward the performance of deeds of valour by civilians, both men and women. It ranks immediately after the Victoria Cross, and is worn before the insignia of all orders and before all other decorations. It took the place of the medal of the Order of the Brit. Empire for Gallantry (E.G.M.), holders of the E.G.M. receiving the G. C. in substitution. There is a military div. of the Cross to permit its award to members of the fighting services who perform acts of great gallantry not in face of the enemy. Among the first recipients were persons who rendered heroic service during Ger. air raids on Britain. Another notable award was to the is. of Malta in recognition of its gallant resistance in the Second World War.

George Frederick Augustus (1832-1904), king of Saxony, b. Dresden, the youngest son of John of Saxony. During the Austro-Prussian war of 1866 he distinguished himself by his military ability and courage, and was made a Prussian field-marshal in 1888. He succeeded his brother Albert on the throne of Saxony in 1902.

George Gemistus Plethon (c. 1355-1452), Byzantine philosopher, b. Constantinople. Founded a sect on the principles of Neoplatonism. His treatises on Plato and Aristotle and on Zoroaster were pub. posthumously. Works printed in J. P. Migne's *Patrologia Graeca*, clx, 1866. See W. Gass, *Gennadius und Plethon*, 1844; H. F. Tozer's article on Plethon in the *Journal of Hellenic Studies*, vii, 1886; and

A. Klekel, *Die Philosophie der Renaissance*, 1925. See NEOPLATONISTS.

George Heriot's School, Edinburgh, public school for boys, founded in 1628 as a residential school for the maintenance and education of fatherless sons of burghesses under the will of George Heriot (q.v.). It was originally called Heriot's Hospital. Its benefits were later extended, and it is now a day-school.

George of Trebizond (1395-1484), Gk philosopher and scholar, b. in the is. of Crete, but descended from a family of Trebizond. As a scholar he was famous in connection with the revival of the study of Gk in Italy. He became prof. of rhetoric and philosophy at Venice, and gained a great reputation as a teacher and translator of Aristotle, engaging in controversy with his contemporary Gemistus Plethon (q.v.).

George the Scholar, see GERNADIUS II.

Georgetown: 1. Cap. of Brit. Guiana (q.v.) and its chief port, on the Demerara R. The chief exports are sugar, coffee, and rum. There are 2 foundries, a dry dock, and factories for the manu. of rice, cigars, chocolate, candles, aerated water, ice, etc. G.'s deep-sea fisheries are important for local consumers. A modern system of sewage disposal, and electricity, were installed in 1929. G. is connected by rail and ferry with New Amsterdam and the W. coast, and by steamer with the coastal dists. and rivs. Owing to the swampy nature of the surrounding dist. the climate is somewhat unhealthy, though it has much improved of late years. The botanical gardens are rightly famous. Artesian wells supply the city with water. The pre-1945 city was well built on low, flat land, and most of the houses were made of wood. G. was devastated by a fire on 23 Feb. 1945. There was, however, only 1 life lost. The damage was estimated at £2,000,000; but the city has made a full recovery. Pop. 94,200.

2. Municipality in Penang Is., off the W. coast of the Malay Peninsula. It is the main port of the Federation of Malaya, and was elevated to city status by royal charter on 1 Jan. 1957. Pop. 210,000.

3. City and the co. seat of G. co., South Carolina, U.S.A. It is a seaport of some importance, and has steamship communication with New York. It is served by the Seaboard Airline railway, and by steamer services. It has turpentine distilleries, and exports rice, cotton, fish, lumber, etc. G. is famous as the landing-place of Lafayette on his first visit to the U.S.A., and the tn was settled about 1700, incorporated in 1805, and chartered as a city in 1895. Pop. 6000.

4. City, now included within the limits of Washington, in the District of Columbia, U.S.A. Many famous people have lived here, amongst them being Francis Scott Key, J. H. Payne, and J. M. Mason. It was settled in the latter part of the 17th cent., chartered in 1789, and annexed to Washington in 1895.

5. Tn in Tasmania, on the E. bank of the R. Tamar. Formerly a small fishing

centre, G. has grown rapidly since aluminium production works were opened at Bell Bay in 1947. Wharves have been built to enable steamers to discharge and load. Some farming is carried on in G. Pop. 2340.

Georgia: 1. (Georgian *Sakartvelo*) (constituent rep. of the U.S.S.R., situated in W. Transcaucasia (see TRANSCAUCASIA) adjacent to the Black Sea and the Turkish border. It is largely mountainous, with the main Caucasian range in the N., the Lesser Caucasus in the S., elevated plains in the E., and the Colchis (q.v.) lowland in the W. W. G. (see ARKHAZIA; ALZHAR AUTONOMOUS REPUBLIC; IMERETIA; MINGRELIA) has a humid, Mediterranean climate and subtropical vegetation; E. G. (see IBERIA; KAKHETIA; SOUTH OSSETIAN AUTONOMOUS OBLAST) has a dry, continental climate. The chief rivs. are the Kura and the Rioni. There are large manganese deposits, also coal, oil, peat, and mineral waters. The Georgians, a Caucasian-speaking people, are subdivided into sev. tribal and local groups with different dialects, traditions, and customs. They are mostly Orthodox Christians (since AD 318), with Muslim and Rom. Catholic minorities. Maize, wheat, tobacco, tea, and citrus fruits are cultivated; viticulture and sericulture are practised, and sheep, hogs, and poultry raised. There are varied food and light industries, engineering, metallurgy, coal- and manganese-mining, and oil extraction and refining. The chief tns are Tbilisi (cap.), Kutaisi, Batumi, Sukhumi, Rustavi, Chiatura, Poti, Mtskheta, Telavi. G. was well known in antiquity, and the existence of a Georgian kingdom in Iberia can be traced back to the 3rd cent. BC. Sometimes united, sometimes split into 2 or 3 kingdoms and sev. principalities, G. withstood conquest and domination by Romans, Persians, Byzantium, Arabs, Seljuk Turks, Mongols, the Ottoman Empire, and again Persia. The most outstanding Georgian rulers were King David IV the Builder (1089-1125) and Queen Tamara (1184-1213), both of the house of Bagratidae (q.v.). Under Tamara G. and its vassal tns. comprised the whole of Transcaucasia and neighbouring areas. The celebrated Georgian poet Rustaveli was her contemporary and dedicated to her his famous poem *The Knight in Panther's Skin*. Before 1774 W. G. was under Turkish suzerainty, E. G. under Persian. In 1783 the king of E. G. obtained Russian protection. The last E. Georgian king, threatened by Persia, ceded his country to Russia in 1800. Most princes of W. G. followed in 1803-4, though the mountainous Svanetia was not annexed until 1858. The 19th-early 20th cent. was a period of rapid growth of Georgian pop. and economic and cultural progress. Politically most influential in G. were the Social Democrats—Mensheviks (see MENSHEVIK; RUSSIAN SOCIAL DEMOCRATIC LABOUR PARTY) and Georgian Socialist-Federalists, a Populist (see POPULISM) party which advocated a Transcaucasian Fe-

deration (q.v.) within a Federal Russia. The Transcaucasian Federation was in fact formed under Menshevik leadership after the Oct. Revolution (q.v.), but soon broke up, and in 1918-21 G. was a separate democratic rep. with a Menshevik gov., first independent, then under Brit. occupation, and mostly at war with Armenia and Azerbaijan. In 1921 G. was easily conquered by the Red Army with the help of local Communists and transformed into a Soviet rep. From 1922 to 1936 G. belonged to the Transcaucasian Soviet Federal Rep. A large-scale anti-Communist uprising in 1924 was suppressed, as were riots in Tbilisi in 1956. Area 27,000 sq. m.; pop. (1956) 4,000,000, mostly Georgians (60 per cent), Armenians (12 per cent), and Russians (9 per cent). See W. E. D. Allen, *A History of the Georgian People*, 1932.

2. One of the original 13 states of the U.S.A. It is a S. Atlantic state, bounded on the N. by Tennessee and North Carolina, on the E. by South Carolina and the Atlantic Ocean, on the S. by Florida, and on the W. by Alabama. It is the largest state E. of the Mississippi. The total area is 58,876 sq. m., of which 300 sq. m. are water. The surface of the state is divided between highlands and lowlands, the Blue Ridge Mts (average elevation 3000 ft) terminating in the N. part of the state. Its drainage system is extensive, the prin. rivs. being the Savannah, the Altamaha, the Chattahoochee, and the Flint. The climate of G. shows a wide range of temp., and differs considerably in the various localities. In S. G. the climate is similar to that of N. Florida. The winters and summers are, however, free from extremes, and on the whole the climate is temperate. The greatest rainfall occurs in the extreme N., and the smallest in the E. G. is also notable for its variety of soils. In the N. part sands and clay predominate, but in the extreme NW. the soil possesses great fertility, being of a loamy character. By far the greatest variety is found in the coastal plain region; here abound red clay, grey sandy soils, and a subsoil of yellow loam. The flora and fauna of G. have no distinctive features, but in mineral resources it shows as great a variety as in its climate and soils. The most important of these is stone. The marble industry, too, has steadily grown in importance during the past years, and the G. marble has gained a reputation throughout the U.S.A. Other mineral products are silver, copper, asbestos, talc, mica, slate, limestone, cement, etc. Coal is not extensively found. Gold was found in White Co. in 1829, and even diamonds have been discovered, though not exploited. The fisheries of G. are important, oysters and shad constituting the bulk of the catch. Farming and manufacturing are the primary bases of the state's economy. The products are extremely diversified, and with the exception of the tropical fruits of California and Florida G. can cultivate almost everything produced by the U.S.A. The prin. cereals

grown are corn, wheat, oats, and rice. G. ranks second among the cotton-growing commonwealths, and has an enormous cotton-growing area. Cotton, peanuts, and tobacco are the chief cash crops. G. leads the U.S.A. in peanut and pecan production, and ranks high in peaches, and some truck crops. Livestock raising is extensive. The growth of sugar-cane is increasing. The chief industry is the manuf. of cotton-goods; others are the production of lumber, fertiliser, and food products, metal fabricating, brick and tile manufacturing, mining, printing, and publishing. Manufacturing has now passed agriculture in importance owing to the vast development of waterpower. Forests, chiefly pine, cover two-thirds of the state. G. produces 75 per cent of U.S.A. naval stores (about 50 per cent of world production) and tyre cord. Since 1916 education has been compulsory. Institutions of higher learning include the univ. of G. (at Athens), G. Institute of Technology, Emory Univ. (at Atlanta), and Mercer Univ. (at Macon). The cap. is Atlanta and the chief port Savannah. G. was the last of the Eng. colonies to be estab. in America, and is called after George II of Great Britain. It was founded by Oglethorpe as a refuge for poor debtors. It took an important part in the revolutionary war. In 1861 it passed the ordinance of secession and in 1870 was re-admitted into the Union. Pop. 3,444,580. The prin. cities are Atlanta, 331,314; Savannah, 119,638; Columbus, 79,611; Augusta, 71,508; Macon, 70,252. See C. Howell, *History of Georgia*, 1926; E. M. Coulter, *A Short History of Georgia*, 1933; and A. B. Saye, *New Viewpoints in Georgian History*, 1943.

Georgia, Gulf of. This strait separates Vancouver Is. from Brit. Columbia: it is 30 m. broad and about 250 m. long. It meets the Pacific Ocean at Queen Charlotte Sound on the N. and Juan de Fuca Strait on the S.

Georgian Architecture, see ENGLISH ARCHITECTURE.

Georgian Bay constitutes the N.E. section of Lake Huron in North America, and is divided from the lake by Manitoulin Is. and the peninsula containing the 2 cos. Grey and Bruce. The bay is nearly 100 m. long and 50 m. broad. It is fed by many rivs., chief among which are the R.s. French, Maganatawan, and Muskoka. The S. portion of the bay is watered by the R. Nottawasaga. The Trent Valley Canal connects the bay with the bay of Quinte and Lake Ontario.

Geosyncline, geological term applied to a part of the surface of the earth which is subsiding on a regional scale and upon which marine sediments are accumulating. An essential feature of a G. is its size. Virtually the greater part of Wales was occupied by part of a small G. in early Palaeozoic times, while another G. lay where W. and N. Norway are now. The sediments within a G. may reach tens of thousands of ft in thickness as they accumulate on a gradually subsiding sea

floor, a process which may continue for 100 million years or more. Many G.s become mt chains subsequently as these thick successions of sediments are uplifted in a later orogeny (q.v.). Thus the geosynclinal sediments which accumulated during the Mesozoic in the Tethys Sea, a sea which extended from the present-day Mediterranean and S. Europe to Indonesia, were subsequently uplifted during the Tertiary Alpine orogeny to form the Alps and the Himalaya.

Geotropism, see TROPISM.

Gephyrea, name given to a large class of marine worms, which includes the 4 orders Sipunculoidea, Priapulidea, Echiuroidea, and Epithetosomatoiden. The Sipunculoidea are elongated and vermiform in shape, and live in the ooze and sand at the bottom of the sea; occasionally they bore into coral rock: *Phymosoma* and *Sipunculus* are the most important genera. The Priapulidea contain the 2 genera *Priapulus* and *Halicryptus*, cylindrical animals with the mouth at one end and the anus at the other. The Echiuroidea are distinguished by the presence of a long contractile dorsal outgrowth, forming the proboscis. The Epithetosomatoiden contain a single family which are remarkable for their long, tubular proboscis, and for a series of pores which lie on each side of the body.

Gera: 1. Dist. (*Besirk*) of the Ger. Democratic Rep. (E. Germany), bounded on the N. by Leipzig, on the E. by Karl-Marx-Stadt, on the S. by Bavaria, and on the W. by Suhl and Erfurt (q.v.). It was formerly part of Thuringia (q.v.). Area 1478 sq. m.; pop. 751,000.

2. Ger. city, cap. of the dist. of G., on the White Elster, 128 m. SSW. of Berlin. It was formerly the cap. of a Reuss (q.v.) principality. There is a palace and a 16th-cent. tn hall. Textiles, chemicals, and machinery are manuf. Pop. 85,000.

Gerald of Wales, see GRALDUS CAMBRENSIS.

Geraldton, tn 312 m. from Perth in Western Australia, situated on Campion Bay. It is noted as being the port for the Murchison goldfield. It has a good harbour; the chief exports are gold, copper, sandalwood, and wool. Pop. 8308.

Geranium, genus of plants of family Geraniaceae. Chiefly ann. or perennial herbaceous plants with palmately lobed leaves and regular 5-petaled flowers. A characteristic elongated beak-like process attached to the ovary gives the genus the popular name of 'Crane's-bill'. Native species are *G. robertianum*, Herb Robert; *G. columbinum*, long-stalked Crane's-bill, *G. dissectum*, Cut-leaved Crane's-bill, *G. molle*, Dove's-foot Crane's-bill, *G. lucidum*, Shining Crane's-bill, *G. rotundifolium*, Round-leaved Crane's-bill, all ann. *G. argenteum*, *G. cinereum*, *G. endressii*, *G. ibericum*, and *G. pratense* are good garden plants. The garden 'Geranium' belongs to the Pelargonium genus (q.v.).

Gérard, Etienne Maurice, Comte (1773-1852), Fr. gen. and marshal of France under Louis-Philippe. He served as a

volunteer under Dumouriez and Jourdan, became captain in 1794, and accompanied Bernadotte to Vienna as aide-de-camp in 1798. He was present at Jena (1806), Erfurt (1806), and commanded the Saxon cavalry at Wagram (1809). G. first won fame by his splendid charge at Austerlitz in 1805. He went to Portugal from 1810 to 1811, and then did great service to France during Napoleon's Russian campaign, helping to save the rearguard of the Grande Armée during the retreat, 1812. He distinguished himself at Bautzen in 1813, was wounded at Leipzig, but fought at La Rothière and Montereau. Joining Napoleon after his escape from Elba, G. fought at Ligny in 1815 with Grouchy. Louis XVIII named him Grand Cross of the Légion d'Honneur. G. was a member of the Chamber of Deputies in 1822 and 1827, took part in the revolution of 1830, besieged and took Antwerp, 1832, and succeeded Mortier as grand chancellor of the Légion d'Honneur, 1835. Napoleon III made him senator in 1852.

Gérard, François Pascal, Baron (1770-1837), Fr. painter, b. Rome. He entered the Pension du Roi at Paris at the age of 12, and from there went to the studios of Pajou, the sculptor, and Brenet, the painter, whom he left shortly to study under David. He competed for the Prix de Rome in 1789, but was unsuccessful. Two years later he again presented himself, but his father's death prevented the completion of his work. He then went to Rome for a year, but returned to Paris in 1791, and obtained employment under his former master, David, q.v. In 1796 he painted his famous 'Bélisaire,' and the following year 'Psyché et l'Amour.' From 1808 to 1810 he exhibited quite a number of pictures at the Fr. Salon. He is best remembered by his portraits, notably of Napoleon, Talleyrand, Mme de Staël, and Mme Récamier. See memoir by Charles Lenormant, 1846.

Gerard, James Watson (1867-1951), Amer. lawyer and ambas., b. Geneseo, New York. G. graduated from Columbia Univ. in 1890. In 1892 he was admitted to the Bar, and began practice in New York city. He was chairman of the Democratic campaign committee of New York co. for 4 years. He was elected associate justice of supreme court of New York for term 1908-21, but resigned 9 Sept. 1913, in order to become U.S.A. ambas. to Germany. Before the entry of America into the First World War G. was most energetic in seeing to the interests of Brit. prisoners in Germany. He gives a detailed account of his experiences in *My Four Years in Germany*, 1917, written when he had resumed practice in New York.

Gérard, Jean Ignace, see under GRANDVILLE.

Gerard of Cremona (1114-87), medieval translator of Ptolemy's astronomy. He studied ancient wisdom in the Sp. and Muslim schools of Toledo, and having acquired a knowledge of Arabic, devoted the remainder of his life to the making

of Lat. trans. from its literature. His most celebrated works are the translation of Ptolemy's *Almagest* and the *Toledan Tables*. He d. at Cremona in Lombardy.

Gerarde, John (1545-1612), herbalist and writer on gardening. He lived for some time at Holborn, London, keeping a large physio garden there, and practising as a barber-surgeon. He kept Lord Burghley's gardens for over 20 years. In 1596 G. pub. his *Catalogus arborum fruticum ac plantarum . . . in horto Joannis Gerardi* . . . (1100 varieties). His *Herball*, or *Generall Historie of Plantes*, 1597, the most popular of all Eng. herbals, was based on Dodoens's *Stirptum historiac pemptades*, 1583. An enlarged ed. was issued by Thomas Johnson in 1633. G. became master of the Company of Barber-Surgeons, 1607. See M. Woodward, *Gerard's Herball*, 1636; F. Arber (editor), *A Transcript of the Registers of the Company of Stationers of London*, iii. 21, 1875; and Alice Tudor, *A Little Book of Healing Herbs, gathered from an Old Herball*, 1927.

Gérardmer, or **Géromé**, Fr. tn in the dept of Vosges. It is a tourist centre, in a most picturesque position at the E. end of lake G., which is surrounded by mountains covered by fine forests. Part of the tn was burnt in the Second World War. It manufs. textiles, household utensils, and Géromé cheese. Pop. 5800.

Gerasa (modern Jerash), anct city of the Decapolis, Palestine, 56 m. from Jerusalem. It is among the mts of Gilead, about 20 m. E. of Jordan, and has been identified with Ramoth-gilead. In 83 bc it was captured by Alexander Jannaeus of the Maccabean line, and rebuilt by the Romans, 65 bc. G. was very important in the time of the Antonines (AD 138-80), and was a bishop's see in the early Christian era. The ruined forum, colonnaded streets, theatres, and temple probably date from the 2nd and 3rd cents. AD.

Gerbera, genus of perennial herbs, family Compositae, native to Africa and Asia, about 40 species. *G. jamesonii*, Barberton Daisy, is grown for its large daisy-like flowers.

Gerfalcon, see JERFALCON; FALCON.

Gerhardt, Karl Friedrich (Charles Frédéric) (1816-56), Fr. chemist, native of Strasburg. He studied under Liebig at Giessen, and with Chevreul, and trans. sev. works of Berzelius and Liebig. He went to Paris, and in collaboration with Laurent and Cahours contributed to the *Annales de chimie et de physique*. With Cahours he wrote a memoir on essential oils, embodying new theories. G. was prof. at Montpellier, 1844-8, and then returned to Paris, the greater part of his work being done in that city. In 1855 he became prof. of chem. at Strasburg. His chief works are *Précis de chimie organique*, 1844-5, *Introduction à l'étude de la chimie par le système unitaire*, 1848, *Précis d'analyse chimique*, 1855, *Traité de chimie organique*, 1853-6. See Cahours, *Notices sur Charles Gerhardt*, 1856; and

E. Grimaux, *Charles Gerhardt, sa vie, son oeuvre, sa correspondance*, 1900.

Gerhardt, Paulus (Paul) (1607-76), hymn-writer of Saxony, second only to Luther; he studied at Wittenberg, became pastor at Mittenwald, 1651, Berlin, 1657-67; moved to Lübben, 1669, and was pastor there in the Spreewald till his death. G. supported the Lutherans against the other reformed churches. His most celebrated hymns are 'Nun ruhen alle Wälder,' 'Wach auf mein Herz, und singe,' 1648, 'Warum sollt ich mich denn grämen?' 1653, 'Befehl du deine Wege,' 1656 (Wesley's 'Commit thou all thy ways'); 'O Haupt voll Blut und Wunden' (Alexander's 'O sacred head once wounded'). His *Collected Hymns* first appeared 1667. A good ed. is that of A. Ebeling, 1908. See F. Roth, *P. Gerhardt*, 1832 (ed. by Lommatsch, 1893); K. Langbecker, *P. Gerhards Leben und Lieder*, 1841; J. Kelly, *Gerhardt's Spiritual Songs*, 1867; and study by E. Kochs, 1926.

Geriatrics, branch of medicine that relates to diseases of old age. The term was first used by a New York physician, I. L. Nascher, in an article on G. pub. 1909. He advocated a more curative attitude of mind towards the medical problems of the aged as opposed to the traditional approach that little could be done beyond trying to solve the social problems presented by old people without kith or kin to care for them. For a long time in Great Britain the aged have been cared for in infirmaries, alms houses, and old people's homes, some of them local gov. institutions and some charitable foundations. But, in the main, until recently little active medical treatment was given in these beyond relieving certain acute emergencies and providing palliative remedies. During the second quarter of this century social changes, together with advances in medicine, have compelled a new outlook on the problems of the aged sick and G. may be said to have become estab. as a recognised branch of medicine since the end of the Second World War. It was estimated in 1956 that there were 1½ million people living alone in Great Britain and that 63 per cent of these were over 60. Of these, 34 per cent (13 per cent males and 21 per cent females) were bedridden. The number of old people in the pop. has been, and is still, steadily increasing compared with a decrease in the number of younger people, with the result that there are now fewer active members of families to care for their aged relatives in the home, and there has been an ever-growing demand on institutional beds. The financial cost and administrative difficulties imposed on the State-owned hospital service has been considerable. It has therefore become urgent in the interests of the nation as well as of common humanity actively to apply modern advances in medicine to curing the diseases of the aged where possible or, alternatively, to restoring to them the maximum of function. A hopeful, positive approach has taken the place

of the old hopeless, negative attitude, and it is proving increasingly successful. The general aim of G. policy is not to keep patients in bed if they can be got up, nor to send them into hospital if they can be kept at home, and to provide them with an occupation within the limits of their capabilities. To make senile people into active juveniles is clearly impossible, but modern medical treatment enables many of their diseases to be cured or allayed sufficiently for them to become once again useful if not overactive members of society. Many long-standing hospital cases, bedridden and regarded as hopeless, have been made fit to return home by modern treatment. Modern anaesthetics and modern surgery enable remedial operations to be performed on people whose age and infirmity would previously have made such treatment out of the question. Much is being done in the way of clubs and other community activities to restore an interest in life to old people. G. specialists have been appointed in most dists. and they are responsible for directing the treatment of patients in the wards of G. hospitals. They also visit patients who are awaiting admission to hospital, and in consultation with the patient's family doctor they advise on domiciliary treatment. Often this procedure removes altogether the need for admission to hospital. The family doctor, upon whom falls the brunt of the treatment of old people, has to assist him dist. nurses, health visitors, home helps, and such social aids as the 'meals on wheels' service. Physiotherapy (q.v.) and occupational therapy (q.v.) are most important auxiliary aids in G., but neither of these services is sufficiently developed as yet to cover much more than the requirements of hospitals. Chiropody treatment is being used increasingly in G. and has restored many immobile patients to a degree of activity again. The registration of the blind (q.v.) has brought much aid to these people in the way of visitors and services which increase their ability to keep in touch with normal life. See Lord Amulree, *Adding Life to Years*, 1951. See also LONGEVITY.

Géricault, Jean Louis André Théodore (1791-1824), Fr. painter, leader of the Romantic as opposed to the Classical school. He was a pupil of Vernet (1808) and Guérin (1810). During the Hundred Days (1814) he entered the army for a short time. He soon returned to his art, visiting Italy (1816-18) and England (1820-2), painting the Derby at Epsom. 'Le Radeau de la Méduse,' 1819, his most famous work, a great picture of a sea disaster, is now in the Louvre. The Wallace Collection, London, has his 'Equestrian Portrait of the Prince Regent.' His horses are especially fine. Other pictures are 'A Cavalry Officer on Horseback,' 1812, 'Wounded Cuirassier,' 1814, and studies for a picture of a horse-race in the Corso during Carnival. G. also produced a few bronzes and wax-sketches. See C. Clément, *Géricault*,

1867; and *Lives* by L. Rosenthal, 1905, L. Deltail, 1924, and R. Régamey, 1926; also K. Berger *Géricault, Drawings and Water Colours*, 1946, and *Géricault und sein Werk*, 1951.

Gerizim and Ebal, in scriptural geography 2 hills of Samaria, Palestine. The former (c. 2850 ft high) stands opposite the latter (c. 3000 ft high), which is on the N. side of the fertile valley in which lies Nablûs (ancient Shechem). The curse for disobedience to the law was pronounced from Mt Ebal, the blessing for obedience from Mt Gerizim (Joshua viii. 33). After the conquest of Canaan Joshua erected an altar to Jehovah on Ebal (modern Arabic name *Jebel Eslamiyah*). The Samaritans built their temple on G.

Gerle, Hans (16th cent.), Ger. lutenist, see GERMAN (AND AUSTRIAN) MUSIC.

Germ, see BACTERIA; BIOLOGY.

German, Sir Edward (Edward German Jones) (1862-1936), composer, b. Shropshire; studied at the Royal Academy of Music, 1880-7. His operetta, *The Royal Poets*, was first produced at St George's Hall in 1886. In 1888 G. became director of music at the Globe Theatre, London, under Mansfield's management. His incidental music to *Richard III*, 1889, was the first of a series of similar compositions for Shakespearean and other plays. *Henry VIII* appeared at the Lyceum, 1892-3, dances from which became immensely popular; *Romeo and Juliet*, 1895, *As You Like It* (St James's Theatre), 1896, and *Much Ado About Nothing*, 1898. G. also wrote 2 symphonies, a *Welsh Ithapsody*, and other orchestral works; his later operettas were *Merric England*, 1902, *A Princess of Kensington*, 1903, *Tom Jones*, 1907, and *Fallen Fairies* (with Gilbert), 1909; and he completed Sullivan's *The Emerald Isle*, 1901. G.'s music is of the school of Sullivan, but has far less character, and the O.E. flavour of his dances and *Merric England* is artificial. See life by W. H. Scott, 1932.

German Architecture is here assumed to include Austria and Czechoslovakia, both of which once formed part of the old Ger. empire. At its greatest extent Rom. dominion extended as far as the Danube and the Rhine, but remains of Rom. buildings are chiefly confined to a few cities of the Rhineland, especially Trèves or Trier (*Augusta Treverorum*), where there are ruins of basilicas and baths. The imposing Porta Nigra, a work of the 3rd or 4th cent., stands almost intact. Very little building took place after the Rom. evacuation in the 5th cent.; but under Charlemagne the 'Dark Ages' became less dark than elsewhere; and at Aachen he built the Dom or cathedral in 796-804, partly to serve as his mausoleum. It is a great domed polygon. (The beautiful choir, in late-Gothic style, was added in 1414.) A few minor buildings of the same period survive; then there is a gap until we reach the abbey of Gertrude in the Harz, c. 960; and then come a group of splendid Romanesque churches in the Rhineland, so that this has sometimes been called 'Rhenish architecture';

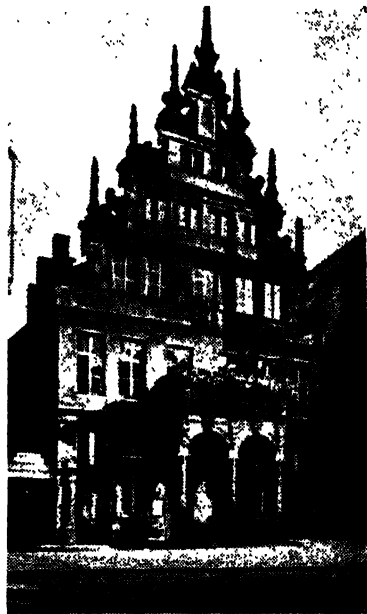
including the cathedrals of Worms (1016-1181), Mainz, Speyer, and Trier; the abbey-church of Laach; and in Cologne the churches of S. Maria im Kapitol, St Martin, and the Holy Apostles. Outside the Rhineland the finest Romanesque churches are the cathedral at Bamberg, and St Godehard and St Michael at Hildesheim. Sev. of these great churches have apses at both W. end and E. end, each generally flanked by gabled towers. Arcading is freely used as external decoration, this being a feature borrowed from Italy. There is little Romanesque architecture of note in Austria or Czechoslovakia.

The transition from Romanesque to Gothic may be studied at the cathedral of Limburg and the churches of St Gercon and St Cunibert, both in Cologne. Ger. Gothic architecture, though distinctive in its later phases, is directly derived from France. Typical examples are St Elizabeth at Marburg; Cologne, Freiburg, Ratisbon cathedrals, and most of Vienna cathedral; the choir of Prague Cathedral; the Frauenkirche at Nuremberg; and sev. fine brick churches in N. Prussia, especially the Marienkirche at Lübeck and the Marienkirche at Danzig. Germany still contains many picturesque timbered medieval houses. Neubrandenburg in Prussia has quaint medieval gates, and the towns of Rothenburg in Bavaria and Goslar in the Harz preserve a medieval aspect. The Renaissance reached Germany and Austria rather late. In Austria it followed the classical tradition more closely than in Germany, where native architects usually derived their inspiration from the same Flem. copy-books that guided our Elizabethan and Jacobean architects; so that Ger. buildings of the late 16th and early 17th cents. resemble contemporary Eng. examples. They include the town halls of Augsburg, Bremen, Leipzig, Molsheim, Paderborn, and Posen; the Marienkirche at Wolfenbüttel, additions to the Schloss at Heidelberg, the Schloss at Aschaffenburg, and those at Stuttgart and Wilhelmsburg. More Italian in appearance are the Schloss at Wolfenbüttel; St Michael's church, Munich; the Hofkirche at Neuburg; the Belvedere and the Micovna in the royal castle at Prague.

Both Austria and S. Germany are very rich in buildings, especially churches, of the Baroque and Rococo periods, including the huge Karlskirche (1716-36) and the Univ. Church at Vienna; 3 large churches at Salzburg; the Theatine church at Munich; St Martin's, Bamberg; the Jesuit church, Mannheim; the Domkirche, Fulda; the Frauenkirche, Dresden; the great monasteries of Melk (1701-16), Wiltingen, Ottebeuren, St Florian, Gottweig; the Residenz, Würzburg; the Czernin, Clam Gallas, and Wallenstein palaces in Prague; the Kinsky and Trautson palaces as well as the great group of royal buildings in Vienna; the Zwinger palace at Dresden; Schloss Nymphenburg at Munich; and

the Rococo palace of Sans Souci at Potsdam.

The 'Greek Revival' (q.v.) reached Germany early in the 19th cent. Its chief products were the Propylaea, the Pinakothek, the Glyptothek, and the Walhalla at Munich, all designed by L. von Klenze (1784-1864); and the Brandenburg Gate, Royal Theatre, Old Museum, and Königswache in Berlin, all by K. von Schinkel (q.v.). Then followed the 'Gothic Revival' (q.v.) and



THE STADTWEINHAUS OF MÜNSTER

A replica (1905) of the old Stadtwinehaus built in 1569-71

next the 'Free Classic' movement, of which typical examples are the Cathedral (1894-1905) and the Reichstag (1884-94), both in Berlin.

Just before the First World War a more distinctive style had begun to appear, fathered by P. Behrens (q.v.), and exemplified in the large departmental-store buildings of Tietz and Wertheim in the chief cities. In the 1920's, however, a sudden change took place, and 'functional' buildings of steel, reinforced concrete and glass were designed by a group of brilliant architects, including Gropius (q.v.) and Mendelssohn (q.v.). Sev. of these men were Jews, and had to

see the country as Hitler came to power. They settled in England or America. Hitler himself had always intended to become an architect: had his ambition been realised, he might have been content, and then the Second World War would never have occurred. Before it began he had managed to secure the erection of the vast Congress Hall and Stadium at Nuremberg, also the Chancellery and the Sports Centre at Berlin, all designed by his *protégé* Albert Speer, who later became one of the chief Nazi ministers. Hitler's aim was to reverse the tendencies of the Jewish modernist architects, and to bring about a return to a more traditional and classic style of building.

German Art. Germany has never occupied a leading position, comparable to that of Italy or France, in the hist. of visual art in W. Europe, but the works produced there have an interesting individual character, and the best of them are acknowledged to approach to the masterpieces of more famous schools.

The medieval art of Germany developed out of that of the Carolingian Empire of the 9th cent. Carolingian art itself was a W. European rather than a specifically Ger. phenomenon, but it has left some monuments on Ger. soil, of which the most important is the octagonal domed chapel, which still forms the nucleus of the cathedral at Aachen, the central seat of Charlemagne's Gov. A specifically national style first appeared in the Ottonian period during the latter part of the 10th and the first half of the 11th cent. This was a period of great activity in architecture (see GERMAN ARCHITECTURE) and MS. illumination and, to a lesser extent, in sculpture. The monastery of Reichenau was specially celebrated for the production of illuminated MSS., of which a fine example is the Gospels of Otto III, now in Munich, executed about the year 1000. The finest surviving sculptures are the bronze doors of the cathedral of Hildesheim executed in 1015. Both the painting and the sculpture of this period, though based on Rom. and Carolingian models, are distinguished by a vigour of emotional expression that is characteristically German. The 12th cent. was a period of less artistic activity, though some fine churches were built. The rock carving of the Deposition at the Externsteine, near Detmold, executed in 1215, is an extraordinarily moving composition. Towards the end of the first quarter of the 13th cent. the Gothic style of architecture began to reach Germany from France. There was also a revival of sculpture in the 13th cent., contemporary with the first introduction of the Gothic style in architecture but itself representing rather a last flowering of the Romanesque. The most important surviving monuments of this style are the series of figures decorating the cathedrals of Freiberg in Saxony, Bamberg, Naumburg, Strasburg, Paderborn, and Münster, dating from between 1230 and 1250. This grand monumental style was succeeded in the 14th cent. by the pretty but

over-elaborate 'international style' of Gothic common to the whole of Europe at that period, and an individual Ger. style in sculpture hardly reasserted itself before the second half of the 15th cent.

There are no monuments of painting surviving comparable in importance to the great sculptured decorations of the 13th cent., but in the later 14th and earlier 15th cent. the 'international style' was developed in interesting and individual ways by such artists as Bertram von Minden and Konrad von Soest in Westphalia, Stephan Lochner in Cologne, and Meister Francke in Hamburg, whose work prepared the way for the great movement of the end of the 15th and the beginning of the 16th cent. This period is justly the most famous in the hist. of G. A. The leading sculptors were Veit Stoss (1438-1533) and Peter Vischer the elder (1455-1529), both of Nuremberg, and Tilman Riemenschneider (1480-1531) of Würzburg, all of whom combine a mannered angular development of Gothic drapery with greatly increased freedom of movement and naturalism of expression. Vischer (q.v.) is especially famous for his bronze statues on the tomb of the Emperor Maximilian at Innsbruck, 1513. In painting we find a parallel development in the work of Martin Schongauer (d. 1499) (q.v.), who is well known as an engraver, and in whose work the influence of the school of the Van Eycks is evident. The works of the artists of the next generation show a greater originality of style, and it is on them that the claim of Germany to have produced a school of painting of major European importance must chiefly rest. Matthias Grünewald (1470/80-1529) (q.v.) is an expressionist painter of unsurpassed emotional force, but the greatest figure is Albrecht Dürer of Nuremberg (1471-1528) (q.v.), unrivalled in his country as painter, engraver, and draughtsman. Dürer twice visited Venice and was influenced by the developed Renaissance art which he saw there. This influence was mainly confined to his paintings and was not wholly beneficial as may be seen in his 2 panels of apostles in Munich. He is at his best as a portrait painter and as an engraver and draughtsman, where he combines clarity of design with rich and exquisite detail. His water-colour sketches are remarkable for the breadth of handling. Gifted younger contemporaries of Dürer's were Hans Baldung Grien (1475/80-1545) (q.v.) and Albrecht Altdorfer (c. 1480-1538) (q.v.), while Lucas Cranach the elder (1472-1553) (q.v.), a painter of delightful mythological pictures and excellent portraits, carries to the middle of the century something of the spirit of its opening years. The troubles of the Reformation brought about a decay of artistic activity after about 1530. In architecture a mannered style of Renaissance decoration, of Flem. inspiration, supersedes the elaborate late Gothic, but in plan and construction buildings retain their essentially Gothic character. In sculpture there are no figures of

outstanding importance. In painting there are some good local schools of portraiture, but the only really important artist is Adam Elsheimer of Frankfurt (1578-1610) (q.v.), who spent the last decade of his life in Rome. The Thirty Years War checked even this reduced activity and the art that we find in the second half of the 17th cent. is mainly a court art, based on imported Baroque models and with little connection with anything that had gone before. Recovery from the Thirty Years War was slow, and it is not until the end of the century that Germany produced an architect and sculptor of note in Andreas Schlüter (1664-1714), who built part of the Schloss at Berlin and made the equestrian statue of the Great Elector there.

During the first half of the 18th cent. a development of the Baroque style took place in S. Germany in which architecture, sculpture, and painting were combined to produce the most striking theatrical effects. Though the origins of this style are to be found in Italy it represents an important and original Ger. contribution to the Baroque movement. The 18th cent. produced no very notable native painting. The most important painter working in Germany during the first half of the century, Antoine Pesne (1683-1757), was a Frenchman, and the great Venetian, G. B. Tiepolo, worked some years at Würzburg in the middle of the century. Anton Raphael Mengs of Dresden (1728-79) (q.v.), the most prominent artist of the second half of the century, worked much in Italy and based his style on the It. painters of the High Renaissance. At the end of the century, the Neo-Classical style was enthusiastically adopted in Germany and retained its popularity until the middle of the 19th cent.

In sculpture the Neo-Classical style is found in the works of Gottfried Schadow (1764-1850) (q.v.). In the second half of the century Adolf Hildebrand (1847-1921) (q.v.) based his style on a wider traditionalism, drawing inspiration from the great masters of the Renaissance as well as from classical models. More interesting movements are found in the painting of the 19th cent. Contemporary with the Neo-Classical style in architecture and sculpture was the Romantic movement in painting which was distinguished by a clarity of form which it owed to Neo-Classical influence. At the beginning of this movement stands a group of painters active in Rome, and known as the Nazarenes, who in their aims and methods in some respects anticipated the Eng. pre-Raphaelite Brotherhood. Their leader was Friedrich Overbeck (1783-1869) (q.v.). Philip Otto Runge of Hamburg (1777-1810) (q.v.) followed a similar line, and but for his early death would probably have occupied a dominating position. More frankly Romantic was the work of the great landscape painter Caspar David Friedrich (1774-1840) (q.v.). The Romantic style was carried on in the next generation by Ludwig Richter

(1803-84), Moritz von Schwind (1805-71) (q.v.), and Alfred Rethel (1816-59) (q.v.). A more straightforward realist painter was Adolf von Menzel (1815-1905) (q.v.), while a richer and more impressionist style of painting distinguished the Romanticism of Arnold Böcklin (1827-1901) (q.v.), Anselm Feuerbach (1829-80) (q.v.), and Hans von Marées (1837-87). Franz von Lenbach (1836-1904) (q.v.) and Wilhelm Leibl (1844-1900) were figure painters of distinction. The influence of the Fr. Impressionist movement can be seen in the work of Max Lieberman (1847-1935) (q.v.), while post-Impressionism was reflected in the Expressionism of Paula Modersohn-Becker (1876-1907) and Franz Marc (1880-1916). The sculpture of Ernst Barlach (1870-1938) and Käthe Kollwitz (1867-1945) was harsh but sincerely expressive. During the period between the First World War and the advent of Hitler Ger. artists tried a bewildering variety of experiments both in sculpture and painting, ranging from revival of primitive styles to complete abstraction. The policy of Dr Goebbels favoured a negative academic traditionalism or an hysterically expressive propaganda. After dictatorship and war no certain direction appears in G. A. Some artists, such as George Grosz, Max Beckmann, Lyonel Feininger, were to find the U.S.A. congenial. Some, like Bernhard Heiliger (1915-), have been influenced by Henry Moore. Earnestness and sincerity in modern efforts (which include a struggle with the problems of abstract form), says Prof. C. G. Heise of the Hamburg Kunst halle 'are witnesses of past suffering.' See G. Dehlo, *Geschichte der deutschen Kunst*, 1919-34; W. Museler, *Deutsche Kunst im Wandel der Zeiten Berlin*, 1938; H. Picton, *Early German Art and its Origins*, 1939; and *Works of Art in Germany (British Zone of Occupation: Losses and Survivals in the IVar (H.M.S.O.), 1946.*

German Art Museums. Of great importance is the Bavarian State Gallery, commonly known as the Old Pinakothek, Munich. It was built early in the 19th cent. by Ludwig I, housing the existing dual collections (that of Maximilian Emmanuel (1679-1720) being especially notable). Later the Elector Palatine, Charles Theodore, transferred to Munich the Mannheim collection formed by the Elector Charles Philip; while his successor Maximilian IV added 2000 pictures of the Zweibrücken collection. In 1795 the Fr. under Moreau entered Munich and pillaged the galleries, though some of the stolen works were returned after 1815. Previously (1805) the famous Düsseldorf academy collection, founded by Maximilian III Joseph, was transferred to Munich. Ludwig I not only built the present gallery but added a fine collection of altar-pieces. The building was severely damaged in World War II but the pictures were, happily, safeguarded (and many shown at the National Gallery, London, in 1949). The Munich gallery

is, naturally, strong in the works of the Ger. masters, such as Michael Pachier, Altdorfer, Hans Baldung Grün, Schongauer, Grünewald ('Christ Mocked'), and Dürer. Among the great Flem. artists examples of whose best work may be seen here are Rogier van der Weyden, Dirck Bouts, Memling, Gerard David, and, above all, Rubens, who is represented here by the most varied paintings—from the immense 'Last Judgment' to the 'Drunken Silenus' and 'Landscape with Rainbow,' besides portraits of himself and his first wife. Here, too, is Jordaens's 'The Satyr in the Peasant's Home' illustrating Aesop's fable, and Van Dyck's popular 'Rest on the Flight to Egypt.' Among outstanding pictures of the Dutch school are Rembrandt's 'Abraham and Isaac' and 'Descent from the Cross'; Hals's 'Fish Girl,' and a seascape by Cuyt. The Munich gallery is not very rich in examples of the It. schools, though there is a painting of the Holy Family by Raphael, Perugino's 'The Virgin appearing to St. Bernard,' Botticelli's 'Pietà,' and a 'Virgin and Child' which many experts consider a Leonardo. Titian is well represented by a beautiful 'Madonna and Child' and a portrait of Charles V. Other outstanding pictures are Goya's portrait of Luisa, queen of Spain, Poussin's 'Apollo and Daphne' and 'Mourning Christ,' and the rare series of tavern pictures of Adriaen Brouwer.

The foundations of the Dresden Gallery collection were laid by Augustus I in the 16th cent. and by Francis III, duke of Modena, who purchased Raphael's 'Sistine Madonna' from the Benedictines of San Sisto. This is commonly regarded as the supreme treasure of the collection, but other and equally outstanding pictures are Titian's 'Christ and the Tribute Money,' 'Madonna and Child with Saints,' and 'The Man with a Palm'; Correggio's 'Holy Night'—remarkable for its lovely irradiating light effect; Lotto's 'Madonna with Christ and St. John'; the Swiss painter Lotard's 'Chocolate Girl'; Rembrandt's 'Saskia with a Pink' (i.e. Saskia van Uylenborch (Uijlenburgh), the Frisian girl whom Rembrandt married); Holbein's portrait of the Sieur de Morette; Vermeer's 'Young Courtesan'; and Giorgione's 'Sleeping Venus'—supposed to have been left unfinished and completed by Titian. There are also many works by Lucas Cranach and a self-portrait and other works by Dürer. The Dutch collection is also famous—works by Hals, Brouwer, Adriaen van de Velde, the 2 Ruysdaels, Van Goyen, and many lesser-known masters. After being in Soviet hands, pictures from the collection, including the great Raphael were returned to E. Germany in 1955.

The Kaiser Friedrich or National Museum, in Berlin, was named after the Emperor Frederick III—the nucleus of its paintings being the Guistiniana collection bought in France in the early 19th cent. and some hundreds of works collected by Edward Solly, an Eng. trader resident in Berlin in the same period. The finest

masterpieces in the collection were the radiant 'Daniel's Vision' by Rembrandt; Van Dyck's portrait of the Marchesa Geronima Spinola; Vermeer's 'Pearl Necklace'; Holbein's portrait of George Gisze; Giovanni Bellini's 'Christ Risen'; Zurbaran's 'Group of Theologians'; Signorelli's 'Pan'; Dürer's 'Young Woman'; and Frans Hals's 'Hille Bobbe' and 'Mother and Child.' Signorelli's 'Pan' was a major loss in the last war. The gallery is naturally very strong in the Ger. school from the early masters to the mature era of Dürer and his contemporaries. Among Ger. artists represented here besides those mentioned, are Altdorfer, Breu, and Adrian Richter. Rubens is particularly well represented, notably by his 'Perseus and Andromeda,' and 'St. Cecilia.' Other Low Country masters with notable works here are Ter Borch, with 'Concert'; Pieter de Hooch, and Koninck, with a 'Landscape.'

German Baptist Brethren, the legal name until 1928 of the Church of the Brethren. *See under* BRETHREN, CHURCH OF THE.

German Boarhound, *see* GREAT DANE.

German Bulldog, *see* BOXER.

German Catholics, a religious sect in Germany which broke away from the Rom. Catholic Church in 1844, under Ronge, an ex-priest of Silesia, and Czerski, a priest of Schneidemühl, who had seceded from the Rom. Church and formed a congregation of Christian Apostolic Catholics. Their first general council was held at Leipzig in 1845. The essentials of belief were restricted to a few doctrines, and scripture was declared to be the sole rule of faith, no external authority being allowed to interfere with its interpretation. By the end of 1845 the G. C. had some 300 congregations. Internal dissension, however, set in, and strong measures were taken against them. They were expelled from Austria, and their clergy were not recognised in Prussia. Many of the congregations dissolved or returned to Rome, and in 1859 the majority joined the free-thinkers or Free Congregations. Six years later these refused to commit themselves to belief in a personal God. The G. C. have, in fact, been superseded by the Old Catholics (q.v.).

German Colonies. Under the treaty of Versailles (q.v.), 1919, Germany surrendered all her overseas colonies and protectorates. Ger. East Africa was ceded to Britain, being renamed Tanganyika Terr.; Ger. South-west Africa went to the Union of South Africa; Cameroon and Togoland were jointly partitioned between France and Britain (*see* AFRICA; CAMEROONS; TOGOLAND). The Ger. lease of Kiaochow and other interests in Shantung, together with the Ger. Pacific Is. N. of the equator, were ceded to Japan; the Ger. portion of Samoa to New Zealand, and Ger. New Guinea and the remainder of the possessions in the Pacific to Australia. In addition Germany renounced all her special rights and privileges in China, Siam, Morocco, Liberia, and Egypt.

Conformably with the development of a sense of common responsibility for the welfare of mankind, these colonies were received by the victorious Allies not as absolute, sovereign possessions, but as mandated ter. In this way the administration of Ger. colonies in South Africa was entrusted to Britain, France, and South Africa; the Pacific Is. to Australia, New Zealand, and Japan. *See also under the various countries named.*

German Democratic Republic, came into existence 7 Oct. 1949, and comprised the former Soviet zone of Germany and the Soviet sector of Berlin (*see GERMANY, History*). The People's Council, elected 1948, and consisting primarily of a Communist-dominated Socialist Unity party (a fusion of Social Democrats and Communists) was converted into a provisional People's Chamber (*Volkskammer*) and Pieck (q.v.) became president of the rep., Grotewohl (q.v.) prime minister, and Ulbricht (q.v.) deputy prime minister.

Elections were held in Oct. 1950 for the *Volkskammer* on the Communist pattern of no opposition candidates. The gov. National Front list received over 12,000,000 votes; 35,500 ballot papers were invalid. In the elections of Oct. 1954 the National Front received over 11,800,000 votes, 63,900 papers being invalid. Pieck, Grotewohl, and Ulbricht (1957) retain their original posts. Ulbricht's special power, however, resides in the fact that he is first secretary of the Politburo of the S.U.P., which actually governs the country.

The administration—education, industry, etc.—is carried out on Communist lines. Religious toleration is claimed, but in practice there has been a certain amount of active religious persecution. Security is in the hands of a special ministry of state security, and of a militarised People's Police, whose exact numbers are not known but were estimated in 1954 as at least 100,000. The People's Police is Soviet-trained and is regarded by the W. powers as functioning as an E. Ger. army as well as providing an internal secret security service.

Soon after its inauguration, the G. D. R. recognised the Oder-Neisse line as its permanent boundary with Poland, and the expulsion of over 2,000,000 Germans from the Sudetenland as 'permanent and just.'

From time to time the Rep. has made proposals for talks on Ger. reunification, but its drafts have invariably included clauses designed to safeguard the forcible continuance of its existing Communist regime, and have been rejected by the W. powers and by Federal Germany.

From its inception, the economic poverty of the Rep. contrasted markedly with the prosperity of the free economy in the Federal Ger. Rep; and the curbs on personal liberties added to a discontent which found expression in the thousands of refugees who poured into W. Berlin from the E. sector. In the spring of 1953 this discontent became so marked that the rigid gov. was relaxed a little. In

spite of this severe rioting broke out in E. Berlin 16-17 June; and there were similar riots in sev. other E. Ger. tns. In Berlin only the intervention of Soviet tanks restored order. The revolt was followed by immediate repressive measures, but these were later succeeded by a certain amount of conciliation. In Mar. 1954 the Rep. was proclaimed a sovereign state, although it was announced that Soviet troops would remain there temporarily for reasons of security.

Since 1954 the G. D. R. has been a notably quiescent member of the Soviet bloc. A certain relaxation in the rigorous administration appears to have taken place; and the discontent which resulted in the return to power of Gomulka (q.v.) in Poland and in a revolution in Hungary had no marked repercussions in E. Germany. Area 41,770 sq. m. (including Soviet sector of Berlin, 156 sq. m.); pop. (1955 estimated) 17,700,000. *See J. P. Nette, The Eastern Zone and Soviet Policy in Germany, 1945-50, 1951; and S. Brant, The East German Rising, 1955.*

German Dogge, *see* GREAT DANE.

German East Africa, formerly a Ger. colony in Equatorial East Africa, and Germany's largest dependency. It became known as Tanganyika Ter. after the First World War; with the exception of the dists. of Ruanda and Urundi, which were joined to the Belgian Congo, and a small dist. in the S., which was added to Portuguese East Africa, it was mandated to Great Britain by the League of Nations. It is now a trusteeship ter.

German Federal Republic, *see* FEDERAL GERMAN REPUBLIC.

German Language and Literature. Auct Germany, like other European nations in the years of their infancy, spoke a number of dialects, all of which grew out of the Aryan family of tongues. Most of these dialects may be affiliated to one of 2 branches, High German and Low German (Hoch Deutsch and Platt Deutsch), and both of these can be traced as far back as the 7th cent. Besides these, evidence is afforded by the 4th cent. Gothic trans. of the Bible, undertaken by Bishop Ulfilas, of a dialect quite independent of either of the 2 groups mentioned above. To-day High German dialects are split up into the Swabian, commonly spoken in Württemberg; the Alemannic, spoken in S. Baden, Alsace, and Ger. Switzerland; and the Bavarian, which is the everyday language in Bavaria, Upper and Lower Austria, Styria, Tyrol, and Salzburg. The so-called Middle Ger. dialects, the Franconian, Thuringian, Silesian, and Saxon really belong to the High Ger. stock. The Low Ger. branch, on the other hand, comprises Old Saxon and Lower Franconian. In the former dialect was written *Der Heliand*, which is a Christian epic of the 9th cent., and the celebrated *Reineke Vos* (c. 1490) is in a dialect developing from Old Saxon. The latter is father to the modern Dutch and Flem. The modern dialects, known as Frisian and Platt

Deutsch, are relics of Low German. The names High and Low originally described the geographical areas where the different branches were spoken, that is, broadly speaking, S. and N. Germany. The disintegration of the empire into separate kingdoms offers an obvious explanation of the fact that rival dialects lingered so much longer in Germany than, say, in England. But from the Reformation period, when Luther trans. the Bible into a language which was a composite of various forms of High German, the doom of the other branch, at least as far as literature was concerned, may be said to have been sealed.

The primitive Ger. peoples fed their natural love of literature on old legends, heroic sagas, and 'beast epics' (*Tierepos*), the atmosphere of which was invariably pagan and bloodthirsty. The virile and splendid animal satire of *Reineke Fuchs*, which fastened itself so firmly on the popular fancy, and which was retranslated into German from the Fr., was probably compiled originally out of one of these 'beast epics.' As in England during the Norman period, the native tongue was under the Saxon emperors left entirely to the people, being supplanted at court by Lat., then the language of cultured social intercourse. But the fullness of medieval life soon inspired men to write of it in their vernacular. The ideas of chivalry, the pageantry and splendour of the courts, the spirit of faith, and also of adventure, both of which were quickened by the stirring episodes and R. glamour of the crusades, all combined to instil fresh vigour into the common peoples, with the result that in Germany there sprang up the *Minnesänger* (Singers of Love), who correspond to the troubadours of France and the Welsh and Irish bards. During the 13th and 14th cents. these men roamed from castle to castle telling fragments of the great cycles of romance and singing little songs of love and passion. Many of these wandering poets were knights and men of courtly breeding such as Walther von der Vogelweide (c. 1170-c. 1230), the most famous of them all, and it was from their lips that the countryfolk learnt of the deeds of the great Alexander or Charlemagne, or of the exploits of King Arthur and his Knights, or of the Sangrael (The Holy Grail), or of the Dan. hero Beowulf. The immortal *Nibelungenlied* and *Gudrun* are a mine of national and heroic saga to which Wagner naturally turned when he dreamed of founding a national opera, and it is here that the epic and tragical grandeur of pagan folklore finds its noblest expressions. The names of a number of the Minnesingers are still remembered with honour, among them Heinrich von Veldeke, Gottfried von Strassburg, Hartmann von Aue, and Wolfram von Eschenbach, all of whom were authors of court epics (*Tristan und Isolde*, *Der arme Heinrich*, *Parzival*, by the 3 last-named authors respectively). It is important to note that in the 13th cent. laws began to be couched in the native German instead of in Lat., as is

clear from the 2 famous collections, *Sachsenspiegel*, 1230, and *Schwabenspiegel*, 1270. This displacement of Lat. is important, for the fact that the monks wrote a mass of scriptural paraphrase and religious poetry in the classical tongue seemed for the time being to stigmatise German as unworthy of literary usage.

The 15th cent. was fruitful in all kinds of truly popular literature. Thus passion plays and mysteries roused dramatic interest up and down the country and familiarised men in a most delightful manner with the leading figures of biblical story; *Volkslieder*, or national ballads, appealed to the inborn sentiments of patriotism; prose was for the first time handled with success in the romantic and wonder-telling *Volksbücher*, such as *Tyill Eulenspiegel*, *Dr Faust*, and *Die Schildbürger*, whilst the degeneracy of many ecclesiastics offered a rich field both for mocking satires and serious theological discussions. Moreover this and the following century were the age of the craftsmen-poets or *Meistersänger*, the best known of whom is Hans Sachs (1494-1578), the cobbler of Nuremberg and the author of the metrical *Schwänke* and *Fastnachtsspiele*. These men were already associated into guilds for their trade, and conceived the quaint notion of founding also guilds of poetry, which should draw up a strict code of rules for the composition of correct and model verse. The greatest benefactor to literature was, however, Martin Luther (q.v.). His Ger. Bible (1522-34) has already been referred to, but when it is remembered how, with amazing rapidity, this book found its way even to the most insignificant towns and solitary households, and further how eagerly it was read and re-read, it will be admitted that too much stress cannot be laid on its position as a milestone along the path of Ger. literary advancement.

On top of the Reformation came the Thirty Years War, which quenched the springs of literature and art.

From 1624 to 1748 has been called the Age of Imitation. Real literary talent was scarce, and men who had leanings towards letters unfortunately believed that the art of writing poetry could be taught. As in England during the years following the Restoration, the Fr. classicists, Racine, Corneille, and Molière, became the models for all youthful writers of inspiration. At the many courts the Fr. manners and language were zealously cultivated, and the people at large lost sight of their native tales and ballads. To such an extent had the Ger. dialects become adulterated with the steady infiltration of foreign words, that a number of language-reforming societies sprang up everywhere on the lines of the 'Frühbühner League' founded in Weimar, 1617. To this somewhat lifeless epoch belong the Silesian poets who are usually divided into 2 schools. Of the first the chief ornament was the precise and servile Martin Opitz (1597-1639), whilst Hoffmann von Hoffmannswaldau (1618-79) is typical of the second. Romances and

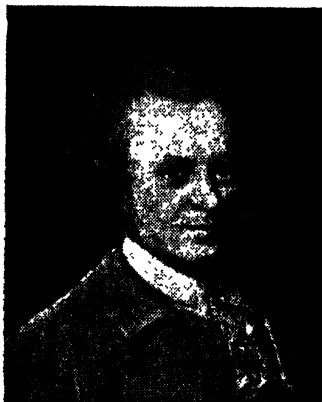
windy tales of fiction and adventure steadily gained ground: many were the Ger. versions of *Robinson Crusoe*, and the stormy years of the Thirty Years War (1618-48) were reflected in numerous *Tales of Ups and Downs*, by far the liveliest of which was the 'Simplicissimus' of Grimmelshausen (d. 1676). The healthy rivalry between the Leipzig and Zürich schools in the 18th cent. contributed much towards clearing away the pedantry and artifice which seemed likely to submerge any real stuff that was written. Thanks to the Swiss leaders, Bodmer and Breitinger, imagination and emotion reappeared in poetry, while Gottsched (1705-66), the foremost of the Leipzig

LESSING.) It is necessary to note the important place which the sensuous and witty romances of Wieland will always occupy in the hist. of Ger. prose, and also his celebrated fairy epic *Oberon*, 1780. (See WIELAND.) From the historical point of view the great merit of Herder was his deep love of all poetry that was truly national. Thus he gathered together the *Volkalieder* of many nations, and studied and wrote about primitive Heb. poetry. (See HERDER.) He may be regarded as the source of inspiration for all that was noble in the *Sturm und Drang* movement, which now assailed literature; but in a broader sense this movement must be regarded as part of that unrest and desire of change which in France was manifested in the great revolution.

The term *Sturm und Drang* (Storm and Stress) was taken from a play of Klinger which bore this title. The intentions of the leading exponents, Klinger (1752-1831) and Maler Müller (1749-1825), were undoubtedly good: they wished to fling away the shackles of art and to give free rein to all their enthusiasms and poetic ideals. Unfortunately, like the dramatists who followed Shakespeare, they were none of them gifted with outstanding literary talents, so that all their plays and novels are marred by extravagances of passion and hideous caricature. To realise the full force of this period of temporary madness it is only necessary to recall the fact that Goethe's *Goetz von Berlichingen* and his *Die Leiden des jungen Werthers*, in which literature may have paid its highest tribute to sentimentalism, were both written under its influence.

Goethe (1749-1832), of course, stands aloof from the normal channels of literary development. His *Faust* belongs to universal literature. It is the summary of its author's mental life, and may be said to mirror the struggles which are eternally raging in every human breast. (See GOETHE.) His *Iphigenie* (prose version 1779, verse version 1787), *Ermont*, 1788, and *Torquato Tasso*, 1790, rank with *Wallenstein*, 1799, *Maria Stuart*, 1800, *Die Jungfrau von Orléans*, 1801, and *Wilhelm Tell*, 1804, four of the finest dramatic productions of Schiller (1759-1805), his friend and almost rival. (See SCHILLER.) These two stand easily at the top of Ger. dramatists. Moreover both Goethe and Schiller outgrew the fevers of the *Sturm und Drang* period, and the former especially discovered the secret of that harmony which exists between the wonderful calm and self-restraint of the Hellenic spirit on the one hand and on the other the warmth, colour, and emotional fullness of the Romantic.

Jean Paul Richter (1763-1825), too, stands quite apart from the contemporary Romantic phase. In his lifetime his novels were even more applauded than Schiller's or Goethe's works, and especially those classified as humorous, the first of which was *The Invisible Box*. All his books are remarkable for their fund of wit and wealth of exuberant fancies.



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men of letters, helped by his *Critical Art of Poetry* to wean men's tastes away from the Fr. to which they had so long been blindly fettered. It remains to notice the 2 great writers of Protestant hymns after Luther, namely Gerhardt (1607-76) and Gellert (1715-69), for it was chiefly through them that literature diffused itself among the common people. Gellert's *Fables* also, with their arresting simplicity, shared in this work of popular education.

The second classical period opens in 1748, and the great movement towards literary regeneration, which may be said to culminate in Goethe and Schiller, was nobly heralded by Klopstock (1724-1803), Lessing (1729-81), Herder (1744-1802), and Wieland (1733-1813). Klopstock's epic, *Messias*, inspired as it was by *Paradise Lost*, is the fullest and finest expression of the unstinted admiration which Germans felt for the Eng. masterpiece. In his *Laocöon* and other critical works, Lessing taught men the difference between the pseudo-classicism of the Fr. and the true Hellenic spirit as it is revealed to us in Gk sculpture and drama. (See

The aims of the Romantic school were not unlike those of Wordsworth and Coleridge and their successors in England. Novalis (1772-1801) was a precursor of this school, but the 'theoretic basis of Romanticism' was estab. by the brothers Schlegel (August Wilhelm, 1767-1845, and Friedrich, 1772-1829). These men and their followers widened the prov. of poetry so as to include music and philosophy and all the other elements of intellectual life; they were opposed to the shallow utilitarianism and unlovely rationalistic theories of their age, and turned back for their inspiration into the medieval days of knights and pageants,

(1786-1837), whose philo-Fr. *Briefe aus Paris* are of vital importance in the progress of Ger. prose; and Heinrich Heine (1797-1856), the greatest of them all. In spite of his negative bias and unbeliefs his poetry will live: for to him was given with Schiller and Goethe that purely inborn gift of lyrical outpouring. (See HEINE.) From this time forward literature gradually grew more and more comprehensive, so that now it includes all branches of knowledge and every field of human interest.

From 1850 to 1870 the novel engrossed most of the best writers. This form of literature became the favourite vehicle of expression all over Europe, probably because it is so elastic that the author may freely bend it to his will and embody in it the whole sphere of his culture and experience. Thus there were many social novels on the basis of Gutzkow's *Ritter vom Geiste*; there were political and anti-quarian novels, there were stories which dealt with the peasants, such as Auerbach's *Schwabenspiegel* *Dorfgeschichten*, 1843-54, and there were tales in the form of biography, such as Keller's splendid *Der grüne Heinrich*, 1855. For some time authors devoted themselves to realistic fiction, but *Buddenbrooks*, 1902, by Thomas Mann and the work of the women writers, Clara Viebig, Helene Böhlau, and Gabriele Reuter, deal rather with problems of emotion and psychology which seem better suited to the Teutonic temperament.

In dramatic literature the two outstanding writers in the 19th cent. were F. Grillparzer (1791-1872), an Austrian, and Friedrich Hebbel (1813-63) (qq.v.).

For other writers, see individual articles.

Twentieth-century German Literature.—

Before the First World War Ger. literature experienced comparative calm. Important writers of this period were the dramatists Gerhart Hauptmann (q.v.), brother of Carl Hauptmann (q.v.), his contemporary Sudermann (1857-1928), Frank Wedekind (1864-1918), the Austrian Hugo von Hofmannsthal (1874-1929), and the poets Dehmel, Rilke, and Stefan George (q.v.). The main influences of this period were naturalism and its opposite 'art for art's sake', Hauptmann leading the former school and Stefan George the latter. The Impressionist novel derived from the naturalists with, however, a greater emphasis on character, particularly as manifested in the artistic temperament. Outstanding among the Impressionist novelists are Emil Strauss (1866-), Hermann Hesse (1877-), who was awarded the Nobel prize for literature in 1946, Jacob Wassermann (1873-1934), and particularly the brothers Heinrich (1871-1950) and Thomas Mann (1875-1955), the latter especially a notable figure in modern world literature; he received the Nobel prize for literature in 1929. Interest was shown by the poets in machinery and the subjection of physical resources to the use of civilised



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of miracles and mysticism. Mentally, too, they travelled further afield into the unexplored riches of the E. and away back into the world of folklore and weird pagan superstitions. It was a time of admirable trans. such as the elder Schlegel's *Shakespeare*, 1797-1810, and it was also a time when Ger. philology and medieval literature were first seriously studied, for both the Grimms came under the influence of Romanticism.

In time the Romantic school began to lose its hold, and after the famous July Revolution of 1830 'young Germany' occupies the literary field. Writers of this period no longer form a definite school, but they all reflect in their works the period of uncertainty and transition through which Europe was then passing. Furthermore, all manner of industrial, social, and economic problems begin to permeate literature, and it is customary also to associate together young Germany and the predominance of Hegelian philosophy. The leading man of letters at this time were Laube (1806-84), the author of social works of fiction; Börne

man. Towards the end of the First World War war weariness and despair, accentuated in Germany by the revolution (1918), had its effect on the younger writers. Johannes Becher in his works violently opposed war, and the chaotic state of life was expressed generally in literature by expressionism (q.v.), a movement borrowed from painting in a spirit of almost ecstatic mysticism. Some writers, such as Armin T. Wegner, turned from the cities and roar of machines to find satisfaction and peace on the land and in the countryside. Labourer poets of the war were Karl Broger, Gert Engelke, Max Barthel, and Heinrich Lersch. War novels were written by Remarque; one of the greatest war books is *Immergang*, written by Fritz von Unruh in the trenches in 1916. Post-war Germany was mirrored in Ernst Toller's tragedy *Hinkemann*, and Reinhard Goering in the drama *Seeschlacht* represents the attitude of the navy in the First World War. Satirists of the early 20th cent. were the novelist Heinrich Mann, the poet and essayist Karl Kraus, and the dramatist Carl Sternheim. Expressionist drama, dealing with types and making use of allegory, was written by Walter Hasenclever, Fritz von Unruh, Franz Werfel, Arnold Bronnen, Ernst Toller (*Seven Plays*, Eng. trans. 1935), Georg Kaiser, and Anton Wildgans. A significant novelist of this period was Alfred Döblin (1878-1957) (*Die drei Sprünge des Wang-Lun; Berlin-Alexanderplatz*). The works of Franz Kafka (q.v.) only gained influence after the author's death. The Expressionist writers were as a rule Socialists, Kurt Eisner (q.v.), the poet, being assassinated, while another tendency revealed in their work was their changed attitude towards women, relationship between men and women being intellectual rather than emotional. In 1922 Expressionism subsided and painters and writers, tired of dealing with types and symbols, sought new forms. Some writers, such as von Unruh, made use of historical subjects, while others have shown a renewed interest in the Catholic religion. Another interesting tendency was the marked manifestation of Jewish temperament, owing to the great number of Jewish writers who achieved international fame—Wassermann, already mentioned, Feuchtwanger (q.v.), Stefan Zweig, Bruno Frank, and Emil Ludwig (q.v.). The Austrian novelist and playwright Robert Musil (1880-1942) became known posthumously by his great and long novel *Der Mann ohne Eigenschaften*, 1930-3 (trans. under the title of *The Man without Qualities*, 1953 ff.), dealing with life in pre-war Austria. Hans Carossa (1878-1956) wrote fine autobiographical stories. Among poets Rilke gained in stature until his death in 1926, and is now recognised as one of the major poets of the 20th cent. Even under the Nazis literature managed to survive persecution and dictation principally by devotion to historical and biographical work in which hostility to the regime could be disguised.

Alfred von Martin's *Burckhardt und Nietzsche*, 1941, and Matthias Gelzer's *Julius Caesar*, 1941, are examples. The majority of great writers, however, went into exile.

Surrealist tendencies had their exponents in Hermann Kasack (*Stadt hinter dem Strom*) and Hermann Broch (*Der Tod des Vergil, Die Schuldlosen*), both writers dealing with man's relationship to death and his expectations after death.

Immediate post-war literature was chiefly concerned with the attempt to explain the rise and fall of Nazi Germany. The first work of moral and literary merit was Theodor Haecker's *Tag- und Nachtbücher*, 1947, justifying the catastrophic end of the Reich. Political works having little literary value continued to appear during the following years, among them Gerhard Ritter's *Europa und die deutsche Frage*, and Erich Meissner's *Zwiespalt im Abendland*, 1950. Gerhard Nebel wrote an outstanding account of the last stages of the Italian campaign in *Unter Kreuzfahrern und Partisanen*. A further feature in W. Germany was the great number and popularity of translations, especially of Brit. and Amer. fiction, whilst literature in E. Germany began to reflect the political situation on Marxist lines, represented by Anna Seghers and Bertold Brecht (q.v.).

Among contemporary essayists and novelists who have established themselves are Ernst Jünger (q.v.) and his brother Friedrich Georg Jünger, Gerhard Nebel, Walter Jens, Heinrich Böll, and Hans Werner Richter. Lyrical poetry is represented by the works of Hermann Hesse (q.v.), Gottfried Benn (q.v.), Günther Eich, Rudolf Hagelstange, Hans Egon Holthausen, and Manfred Hausmann. Erich Kästner (q.v.) is a writer of topical satire, and also a well-known author of children's novels. In the field of drama the names of Bertold Brecht (q.v.), Carl Zuckmayer (q.v.), and the Swiss playwrights Max Frisch and Friedrich Dürrenmatt have become known, mainly for a tendency to disregard tradition and to create new provocative plays.

Recent Christian literature has been represented by the Protestant poets Rudolf Alexander Schröder and Otto von Taube, who has also trans. numerous poems from sev. languages, including those of Wm. Blake. Catholic writers include Gertrud von Le Fort, Hans von Savigny, Stefan Andres, Werner Bergengruen, and Reinhold Schneider; Edzard Schaper's novels reflect a deep and convinced Christian mentality. See also SWITZERLAND, Literature.

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German Measles, or Rubella, see under MEASLES.

German (and Austrian) Music. If Germany and Austria are usually thought of as having excelled every other country in their cultivation of music, this is not so much a matter of historical fact as of chronology. So far as composition is concerned, at any rate, their hegemony is

of recent date, and therefore easily remembered; but it lasted scarcely longer than a century and a half, roughly and perhaps debatably from 1750 to 1900. A great tradition has remained, and has certainly maintained itself in performance, especially of opera, and it is a tradition dating sev. centuries back; a number of considerable composers are found in the 16th cent. and a few in the 15th, though none to compare with the greatest Flem., Fr., It., and Eng. figures until we come to Hans Leo Hassler (b. 1564) and the first universal Ger. master, Schütz (b. 1585). Schütz cultivated Passion music, not for the first time, but in such a superior way as to give Germany a claim to it as the earliest indigenous form of musical art. Other specifically Ger. types arose later, as we shall see presently; but there had been nothing before the Passion comparable in exclusiveness to the polyphonic church music of the Netherlands, the Fr. *chanson* for sev. voices, the It. madrigal and its forerunners, or the Eng. string fantasy.

There had however been, as in other countries, music produced anonymously in the shape of songs and dances. Songs in parts and some dances were written down and gathered in 15th-cent. collections such as the song-book of Lochheim and Glogau. Meanwhile solo song had thrived from Walter von der Vogelweide in the 13th cent. to the last of the Minnesinger, Oswald von Wolkenstein, who d. in 1445. But the *Minnesang* was not a new contribution to music exclusive to Germany, for it was largely modelled on the troubadour and trouvère songs of France. And the songs of the 15th-cent. Meistersinger, which were transferred from the aristocracy to middle-class craftsmen, of whom Hans Sachs of Nuremberg is the most famous, were too cramped by old rules to represent a truly new art. A distinctly Ger. type was the chorale, the hymn set in 4 parts, which came in with the Lutheran Reformation for congregational use; but precisely because it aimed at encouraging the people to take part in the singing, its tunes were as a rule those of secular songs already familiar. Of course, hymns existed elsewhere, in the Genevan psalter, for instance. But an exclusively Ger. form of instrumental composition was later to arise out of the chorale. On the instrumental side the 15th and 16th cents. advanced particularly the playing of the organ and the lute, the blind organist Conrad Paumann and the lutenist Hans Gierle, both of Nuremberg, being outstanding representatives. Heinrich Finck, Paul Hofheimer, and the Austrian Leonhard Paminger were composers of some eminence in the 15th cent.

The 16th cent. gave birth to a greater number of creative musicians, none quite reaching the distinction of Hassler, much less the greatness of Schütz. Schütz excelled in music of many kinds, sacred and secular, vocal and instrumental, and wrote the first Ger. opera, *Dafne*, the music of which is lost and the libretto of

which was a trans. by Martin Opitz of that by Rinuccini, first set by Peri and afterwards by Gagliano. Schütz's work was produced at Torgau in 1627 and thus takes us into the next century, which made no further advance in Ger. opera till Theile's *Adam und Eva* appeared at Hamburg in 1678. For the rest, the courts either had It. operas performed, or Ger. composers like Kerll set It. librettos. Two important 16th-cent. composers who remain to be mentioned, mainly for their church music and songs, are Schütz's close contemporaries, Schein and Scheldt, *b.* respectively in 1586 and 1587.

Sev. composers *b.* in the 17th cent. began to build up the important Ger. school of organ music. The earliest were Tunder and Froberger, both pupils of Frescobaldi in Rome, and then came Reinken and the Dane Buxtehude. Buxtehude belongs to Ger. music as organist at Lübeck for many years and was one of the first to introduce the hymns of the day with organ improvisations on them and thus to build up that exclusive Ger. form already referred to, the chorale prelude, which in Tunder's hands had still been variations on the tune rather than fantasies and fugues based on it. Pachelbel and Böhme continued on the same lines before Bach made the chorale prelude his own as one of his most glorious achievements. During the interval between the lives of Schütz and Bach, Passion music was written by Sebastiani. Hammerschmidt, Rosenmüller, and the two Kriegers wrote concerted instrumental music. Biber made a beginning with the violin, and Georg Muffat, Kuhnau and Johann Caspar Fischer wrote for the harpsichord. Kuhnau's 'Biblical' sonatas are striking early examples of descriptive music. The first great Austrian master, Fux, wrote a vast amount of church music, 10 oratorios and 18 operas, which, however, were still Italian. Ger. opera, mixed with It. airs at first, now began to occupy Hamburg in the early years of the 18th cent. Its important composer was Keiser, who managed an opera-house as he wished, Hamburg being a free Hansa city without a court. Matheson was there also, and Handel joined him there for a short time as a young man and wrote his first operas in that mixture of Italian and German. Telemann was a very prolific composer in all kinds of music, *b.* 4 years before Bach.

For incomparably the greatest Ger. composer of the first half of the 18th cent., and one of the supreme masters of all time, see BACH, JOHANN SEBASTIAN. It is true that Handel is in his way as great, but except for his Ger. birth he does not properly come under this survey, for he is not a Ger. composer at all. Like Gluck later, Handel set very few Ger. words to music all his life and, if another comparison may be made, he is no more a Ger. composer than the It.-born Lully is an It. one: both were naturalised in their adopted countries, both altered the spelling of their names, and, what is much

more, neither showed a trace of his native musical style or influence. Handel's music is based on It. influence and much coloured by his Eng. environment. A great Ger. opera composer, Hasse, also remained musically an Italian.

The 18th cent. as a whole shows a crowd of Ger. composers, most of them small figures in themselves, but making a varied picture. Two, both *b.* in 1714, stand out: Bach's second son, Carl Philipp Emanuel, who advanced both keyboard technique and the sonata form with music in the new 'courtly' style, quite different from his father's and often rather vapid; and the Austro-Bohemian Gluck, who hardly belongs to the Ger. school any more than Handel, not because he is now sometimes claimed as a Czech, but because he wrote many operas in the pure It. manner of the time, introduced reforms into that manner, and afterwards into Fr. opera in Paris. But if no individual composer *b.* before Haydn (1732) or between him and Mozart (1756) cut much ice, groups of them started 2 new musical species, one of the utmost importance and predominantly German—the symphony—and another less significant but more purely German—the *Singspiel*. The symphony was all but originated by the 'Mannheim School,' a group of musicians working at the court of Mannheim, where there was a superior orchestra with which they could experiment. It is not completely a Ger. phenomenon, because it grew out of the It. opera overture and because its best representative, Stamitz (actually Stamic), was a Bohemian; another, Beck, went to live at Bordeaux, and a third was the It. Toeschi. The others were F. X. Richter, Holzbauer, Filtz, and Cannabich. The Mannheim symphonies are full of the novel device of strong dynamic contrasts, their thematic material is rather empty, and their form as yet rudimentary; but if the school had had a great composer, the symphony would have reached maturity on the spot, as it did reach it afterwards in the hands of Haydn. The *Singspiel*, a very light type of opera or operetta, in fact hardly more than a play with songs, owed its beginnings to Ger. translations of Eng. ballad operas by Charles Coffey, but its subjects and language at once made it a thoroughly Ger. form of entertainment. Though it contributed little to the Ger. art of music, the *Singspiel* did at least draw many pleasant songs from its best composers, of whom Johann Adam Hiller was the first, followed by Dittersdorf, Umlauf, Neefe, Schenk, Schack, and others, mainly working in Vienna as it happened, though the form began at Leipzig. Mozart's *Entführung* is still in the nature of a *Singspiel*, but transformed into opera by genius.

For the 3 supreme masters who dominate the 18th cent. see HAYDN, MOZART, and BEETHOVEN. Towards the end of the century arose another Ger. species almost as important as the symphony, the *Lied*. The word simply

means 'song,' and it is true that in a sense a *Lied* is merely a song with Ger. words. Nevertheless the species is so characteristic as to constitute a typically Ger. kind of music, recognisable as such even if the words were trans. or not heard at all. Like the symphony, it began with small composers, Reichardt, Zelter, and Zumsteeg, and sometimes in the form—if anything so haphazard can be called that—of long, rambling ballads, which were imitated by Schubert in his adolescence. But Schubert soon saw that merely to string a number of contrasting sections together to illustrate a narrative poem was not to compose a piece of music, and he completely mastered the art of song-writing long before he had come of age. By then he was a major composer and made equally important contributions to the symphony, to chamber music, and to the piano sonata, and enriched almost every other category of music. Weber, b. a decade before Schubert, also wrote songs, but they have not survived. He lives, in fact, by extremely little of his large output, and only one of his operas, *Der Freischütz*, represents his world characteristically as a kind of mixture of *Singspiel* and Fr. grand opera, but with an utterly Ger. and highly romantic character of its own. Other romantic operas came later, such as those by Spohr, Reissiger, and especially Marschner, whose influence on Wagner's *Elving Dusekman* is evident. But all this, including Weber and Schubert, belongs to the next century, as does Meyerbeer, whose work, however, was first Italian and then Fr.

For the 3 great composers b. in the early 19th cent. see MENDELSSOHN, SCHUMANN, and WAGNER. The first was too conservative and the second too individual to have much influence; the influence of Wagner's music-drama in its full maturity was enormous, but it was also curiously unproductive of a great succession, no doubt because he had himself carried out his ideas with such overpowering mastery that nothing was left to be done with them. Kistler, Thuille, Schillings, and early Pfitzner were all handicapped by Wagnerism; Humperdinck's *Hänsel und Gretel* was successful in spite rather than because of its Wagnerian procedure and because of its quite different and freshly charming material; Richard Strauss's operas began to be successful only after the Wagnerian *Guttram*; and Schreker's marked the last stages of decadence. Meanwhile a new type of comic opera had arrived, more solid than the *Singspiel*, and, although German in language, feeling, and subject, as well as in its admitting a special type of over-simple and sentimental song, also had many of the good qualities of Fr. *opéra-comique*. The lightness and elegance of works of this kind by Lortzing, Nicolai, and Flotow was further refined, perhaps over-refined, by Cornelius and Götz. There was also grandiose opera by Goldmark, frankly bad opera by Neessler, and opera inclining towards It. *verismo*

by d'Albert. Turning back to earlier years of the century in Vienna, we find the waltz developing out of the old *Ländler* country dance in the dancebands led by Lanner and the elder Johann Strauss, which was brought to its greatest triumphs by Johann Strauss the younger, who also cultivated the operetta, of which the waltz was an indispensable ingredient. But operetta, together with the waltz, progressively declined by way of Lehár, Fall, Oscar Strauss, and others.

Piano music of as great a refinement as Schumann's, but different according to each composer's character, was written by Henselt, Kirchner, and Jensen (the Hungarian-b. Heller is hardly admissible here). The *Lied* was kept alive by Robert Franz until it was ready to be treated with the utmost subtlety by Hugo Wolf, continued with a certain fervour by R. Strauss, and with a mixture of simplicity and sophistication by Regner. The *Lied* being romantic, modern Ger. music has turned away from it into new channels. The symphony threatened to become picturesquely programmatic in the hands of Raff, a disciple of the 'new German' school of Liszt, a cosmopolitan who is himself no more German as a composer than he is genuinely Hungarian; and it did turn later into the most egotistical means of self-expression with Mahler, who even in his symphonies reveals himself as essentially a songwriter. The 2 notable symphonists of the later 19th cent., though almost comically antagonistic towards each other, are Bruckner and Brahms, the former a rather clumsy composer without the true symphonic art of transition, but a great one in spite of all his faults. For the latter, who wrote in every medium except that of opera and had an enormous influence even beyond his own country, see BRAHMS.

The 20th cent., which begins with the upheaval of Schoenberg's new system (see TWELVE-NOTE MUSIC) that has had an influence as far-reaching as Brahms's, with very different effect, is as yet difficult to sum up. Schoenberg's most distinguished Austrian disciples have been Webern and Berg, while Křenek came to embrace the Schoenbergian creed later and Wellesz resolved to drop it. Another very influential composer, with a very different outlook, is Hindemith, who has also attracted many pupils and, far from renouncing tonality, has based new ideas of key-relationship on the natural harmonic series. His own work, which includes opera and nearly every other musical form, is notably distinguished. Contemporary with Hindemith is Carl Orff, and after him a dozen or so of Ger. composers b. in the 20th cent. have attracted international attention. See H. J. Moser, *Geschichte der deutschen Musik*, 1930; H. Mersmann, *Eine deutsche Musikgeschichte*, 1934; H. Malsch, *Geschichte der deutschen Musik*, 1949; see also composers' names mentioned in this article.

German Ocean, *see* NORTH SEA.

German Silver, or **Nickel Silver**, alloy consisting approximately of 6 parts copper, 3 parts zinc, and 1 part nickel, with sometimes a trace of iron. It forms a white, tough metal, taking a good polish, and is largely used for the manuf. of spoons, forks, and other similar articles, but, as it soon tarnishes, it is usually electro-plated. G. S. has a high electrical resistance, and is largely used for making resistance coils.

German South-West Africa, *see* AFRICA, SOUTH-WEST.

German Volga Republic, *see* VOLGA GERMANS.

Germander, name given to the Brit. species of *Teucrium*, a genus of labiate plants. The wood G. is *T. scorodonia*; the wall G., *T. chamaedrys*, the water G., *T. scorodum*.

Germander Speedwell, *see* BIRD'S EYE.

Germanic Laws, The, designation of the systems of law evolved and codified by the prin. Teutonic tribes on the estab. of native kingdoms at the retirement of the Romans from Germania. The codes date back to the 5th and 6th cents., and show in general a blend of native tribal law and of Rom. law. The following tribes possessed coded laws: Alemans, Bavarians, Burgundians, Frisians, Saxons, Thuringians, and Visigoths. The codes were framed in the Lat. language with scraps of barbaric legal terminology.

Germanicus Caesar (Tiberius Drusus Nero) (15 BC-AD 19), Rom. gen., son of Nero Claudius Drusus by Antonia (Mark Antony's daughter). He was adopted by Tiberius in the lifetime of Augustus, and fought against the Pannonians, Dalmatians, and Germans (AD 7-12). On the death of Augustus (14) G. had command of the legions in Germany when a serious mutiny broke out. After restoring order he devoted himself to the subjugation of Germany with such energy that within the space of a year he had reduced the whole country between the Rhine and the Elbe. Tiberius, jealous of his achievement, recalled him in AD 17, and gave him a general command throughout the E. provs. At the same time, however, he appointed Gn. Piso governor of Syria with secret instructions to thwart G.'s efforts. G. d. at Antioch, poisoned, as was commonly believed, by Piso, whom Tiberius was obliged to sacrifice to the indignation of his subjects. G. was one of the most popular figures of his age. By his wife Agrippina (q.v.) he had 9 children, including the emperor Gaius (Caligula) and Agrippina, the mother of Nero. *See* Tacitus, *Annales*, II, III.

Germanium, chemical element discovered in 1866 by Winkler in argyrodite (GeS₄Ag₂S), a mineral found at Freiberg. It also occurs to a minute extent in the mineral euxenite. In almost all its compounds it is quadrivalent, and it has marked affinities with silicon and other elements of that group. In properties it agrees very closely with Mendeléef's hypothetical eka-silicon. Atomic weight 72.5; melting-point 900° C.

Germentown, NW. residential section of Philadelphia, Pennsylvania, U.S.A. It contains many historic houses, e.g. the Chew House, built by Benjamin Chew, who was imprisoned as a loyalist in 1777, and the Morris House, the H.Q. of Gen. Howe, and the residence of President Washington when Philadelphia was the cap. of the U.S.A. In this vicinity, too, the first paper mill in America was erected in 1690, and the first Bible printed in America was pub. here in 1743. G. was founded in 1683 by 13 families from Germany, incorporated in 1689, and annexed to Philadelphia in 1854. A famous battle in the War of Independence took place here 4 Oct. 1777.

Germanus of Auxerre, St. (c. 378-448), b. there of noble family. He became an advocate at Rome, and after his marriage was made one of the 6 dukes of Gaul. Elected bishop of Auxerre in 418, he at once changed his way of life and became an ascetic. G. visited Britain in 430 and again in 447 to campaign against Pelagianism (q.v.). On the first of these occasions he was responsible for the Alleluia Victory over the Picts and Scots. He d. at Ravenna.

Germanus of Constantinople, St. (c. 650-740), patriarch, transferred from Cyzikus in 715. He defended the practice of the Church against the Emperor Leo and the Iconoclasts with the encouragement of Pope Gregory II. In 730 he was deposed. *See* Heuschoen, *Patrologia Graeca*, vol. 98; W. Smith, *Dictionary of Christian Biography*, 1880.

Germany (Ger. Deutschland; Fr. Allemagne), county of N. central Europe, the boundaries of which have varied at different periods of hist. For the modern hist. of G., *see* FEDERAL GERMAN REPUBLIC; GERMAN DEMOCRATIC REPUBLIC. When the Ger. Empire was estab. in 1871 (*see* History, below) G. had a total area of some 208,800 sq. m., and comprised 26 states: the kingdoms of Prussia, Bavaria, Württemberg, and Saxony; the Grand Duchies of Baden, Hessen, Oldenburg, Saxe-Weimar, Mecklenburg-Schwerin, and Mecklenburg-Strelitz; the Duchies of Brunswick, Saxe-Coburg-Gotha, Saxe-Meiningen, Saxe-Altenburg, and Anhalt; the Principalities of Lippe, Schaumburg-Lippe, Schwarzburg-Sondershausen, Schwarzburg-Rudolstadt, Reuss-Greiz, Reuss-Schleiz, and Waldeck; the Imperial Ter. of Elsass-Lothringen (Alsace-Lorraine); and the Free Hanse Tns. (*see* HANSEATIC LEAGUE) of Hamburg, Bremen, and Lübeck (qq.v.). After the First World War, the treaty of Versailles (q.v.) reduced the ter. of G. by some 27,250 sq. m. by the following transfers: Alsace-Lorraine to France; parts of W. Prussia and Upper Silesia to Poland; Eupen, Malmédy, and Moersnet to Belgium; and N. Schleswig to Denmark. Danzig (Gdańsk) and Memel (qq.v.) also were lost to G., and the Saarland (q.v.) was placed under the control of the League of Nations, France being given certain rights there for 15 years. As a result of the creation of the 'Polish

Corridor' (q.v.) E. Prussia (q.v.) was separated from the rest of the Ger. ter. The new Ger. federal rep., the 'Weimar Republic,' comprised 17 states: the free states of Prussia (including Waldeck), Bavaria, Saxony, Mecklenburg-Schwerin, Mecklenburg-Strelitz, Oldenburg, Brunswick, Anhalt, Lippe, and Schaumburg-Lippe; the people's states of Württemberg and Hessen; the federated state of Thuringia (q.v.), formed by the amalgamation of Saxe-Weimar, Saxe-Coburg, Saxe-Meiningen, Saxe-Altenburg, Schwarzburg-Sondershausen, Schwarzburg-Rudolstadt, Reuss-Greiz, and Reuss-Schleiz; the rep. of Baden; and the Hanse states of Hamburg, Bremen, and Lübeck. After Hitler came into power, the federal states became administrative provs. of the Third Reich, with minor alterations to the boundaries, particularly of Prussia, Oldenburg, and Hamburg. Lübeck became part of Prussia, and Mecklenburg-Strelitz and Mecklenburg-Schwerin were united to form the prov. of Mecklenburg. As a result of the aggressive foreign policy of the National Socialist régime the ter. of the Third Reich was gradually increased, and before the outbreak of the Second World War G. had absorbed Austria, the Sudetenland (q.v.), and Memel, and had created protectorates in Bohemia and Moravia (q.v.). After the defeat of G. in 1945, the Potsdam Agreement (q.v.) provided that the part of E. Prussia lying N. of a line drawn between Braunsberg (Braniewo) and Goldap should be transferred to the U.S.S.R. (the E. Prussian cap., Königsberg, becoming Kaliningrad). It was also decided that, subject to the provisions of the final peace settlement, Poland should administer all the remaining parts of G. lying E. of a line drawn from the Baltic coast, just W. of Swinemünde (Swinoujście), along the Oder and the Lusatian Neisse (q.v.) to the Czechoslovak frontier.

By the Berlin Declaration of 5 June 1945 the govs. of the U.K., the U.S.A., France, and the U.S.S.R. assumed supreme authority in G., and designated separate military zones of occupation. The ter. of Greater Berlin (q.v.), divided into 4 sectors, was to be under joint gov.

During 1946 and 1947 the state of Prussia was dissolved (on 25 Feb. 1947) and G. was divided into *Länder* as follows: in the Brit. zone, Schleswig-Holstein, Lower Saxony, North Rhine-Westphalia, and Hamburg; in the Amer. zone, Bavaria, Hessen, and Württemberg-Baden; in the Fr. zone, Rhineland-Palatinate, Baden, Württemberg-Hohenzollern, and Saar; and in the Russian zone, Saxony, Saxony-Anhalt, Brandenburg, Thuringia, and Mecklenburg.

In June 1948 the U.K., the U.S.A., and France agreed on a central gov. for their zones, and on 23 May 1949 a Federal Rep. of G. (*Bundesrepublik Deutschland*) came into being, its ter. being that of the Brit., Amer., and Fr. zones. On 5 May 1955 the military occupation of the ter. of the Federal Rep. ceased, and on the same day the Paris and London treaties of

Oct. 1954 came into force, and estab. the Federal Rep.'s sovereignty.

In the Russian zone of occupation a Ger. Democratic Rep. (*Deutsche Demokratische Republik*) was formed on 7 Oct. 1949.

In 1949, and subsequently, some minor frontier adjustments were effected, by which small dists. of G. were ceded to the Netherlands, Belgium, Luxembourg, and France.

On 6 July 1950 an agreement between the Ger. Democratic Rep. and Poland declared the Oder-Neisse line to be the permanent frontier between G. and Poland. This agreement, and a further one extending the Polish ter. in Mecklenburg and on the is. of Uedomo, are not recognised by the Federal Rep. or by the W. Allies.

The ter. of G. as it exists to-day (i.e. the ter. of the Federal Rep. of G. and the ter. of the Ger. Democratic Rep.) has an extent of 136,450 sq. m. (of which 94,650 sq. m. are in the Federal Rep.). It is bordered on the N. by the North Sea, Denmark, and the Baltic Sea; on the E. by Poland and Czechoslovakia; on the SE. by Austria; on the S. by Austria and Switzerland; and on the W. by France, Luxembourg, Belgium and the Netherlands. The Ger. Democratic Rep., situated in the NE. part of the Ger. ter., is divided into 14 *Besirke*, which were formed in 1952 (with deliberate non-observance of historic boundaries) to replace the 5 *Länder* of the Russian zone of occupation; they are: Rostock, Schwerin, Neubrandenburg, Potsdam, Frankfurt-an-der-Oder, Kottbus, Magdeburg, Halle, Erfurt, Gera, Suhl, Karl-Marx-Stadt (Chemnitz), Dresden, and Leipzig (q.v.). The Federal Rep. is divided into the following 10 *Länder*: Schleswig-Holstein, Hamburg, Lower Saxony, Bremen, North Rhine-Westphalia, Hessen, Rhineland-Palatinate, Baden-Württemberg (formed in 1952 from the former *Länder* of Württemberg-Baden, Baden, and Württemberg-Hohenzollern), Bavaria, and Saar (q.v.). According to the constitution of the Federal Rep., Berlin (which is partitioned between the Federal Rep. and the Ger. Democratic Rep., the section belonging to the Federal Rep. forming an enclave in the ter. of the Ger. Democratic Rep.) is both a city and a *Land*, but it has not been formally incorporated as such. The present cap. of the Federal Rep. is Bonn (q.v.).

Geography.—In its physical structure G. may be said to fall naturally into 3 divs.: the lowlands of the N., the tableland of the S., and the basin of the middle Rhine. The lowlands are part of the great European plain and stretch from the Netherlands frontier to the Polish frontier. They are largely occupied with sandy tracts, but here and there have peaty heathland (see LÜNEBURG). They are well watered, and in certain dists. are fertile. The S. tableland is interspersed with sev. mt groups, of which the Fichtelgebirge (q.v.) forms the pivot.

To the NW. of the Fichtelgebirge rise the Thuringian Forest and the Harz Mts; to the NE. is the Erzgebirge; and to the SW. lies the Black Forest (q.v.). In the Bavarian Alps, at the extreme S. of Bavaria, is the Zugspitze (9833 ft), the highest mt in G. The fertile and beautiful Rhine (q.v.) valley is sheltered, between Basel and Mannheim, by the Vosges to the W. and the Black Forest to the E. The three great drainage basins of the country are those of the Danube (q.v.) to the S. and E., the Rhine and Elbe (q.v.)

dykes which serve, as in Holland, to keep out the sea where the sand-dunes are not strong enough.

Climate.—Broadly speaking, the physical characteristics of the country do not permit of a good climate; for the level, exposed flats, N. and NE., offer no resistance to the passage in winter of the dry, piercing winds from Siberia and the Arctic, whilst to the S. and W. the mountainous tracts form effectual barriers against the moist anti-trades. As regards temp., the extremes increase



BERNKASTEL AND THE MOSEL (MOSELLE)

to the N. and W., and the Oder (q.v.) to the E. The watersheds are both far from the sea (sev. of the rvs. thus being of considerable length) and comparatively low, so that there are no great falls in the main streams. The chief rvs. are therefore navigable for the greater part of their courses, and their utility has been very much increased by intricate systems of canals. Of the larger rvs. only the Weser (q.v.) is a purely Ger. stream. G. has a coastline (in the N.) on the North Sea and on the Baltic Sea, but it has very few good harbours. The reasons for this are: (1) that on the Baltic Sea shallow lagoons, called Haffs, prevent good anchorage; (2) that the shore waters are not deep enough to take vessels of any size; and (3) that, owing to the lack of protection N. and E., the Baltic ports are constantly choked with ice. Along the North Sea shores there are numerous

eastward in proportion to the distance from the Atlantic. In the warmer lats. of the S., the elevation of the plateaus counteracts the natural tendency to grow hotter, so that Regensburg, in the S., lies on the same isotherm as Hamburg, in the N. In the Upper Harz the rainfall reaches 66 in., as the Harz Mts are far enough N. to catch the rains borne by the winds sweeping across Holland, but the mean ann. precipitation is only about 20 in. On the whole the climate may briefly be described as continental. It should be noted that the general slope of the country is from the SE. to NW., that is, away from the sun, and also that the Rhine valley is so sheltered that it reaps the full benefit of its warm lat., and thus enjoys excellent weather conditions.

Flora and Fauna.—The flora and fauna are numerous in type, including over 2000 varieties of vascular plants and

as many as 16,000 species of insects. All plants peculiar to the temperate zone are cultivated with success, and in general the flora may be said to be such as would be expected from the union, which occurs here, of the Alpine and Baltic elements. As regards the fauna, there are hardly any types which are exclusive to G. The wild boar, stag, and roe continue to occupy the remoter and more hilly dists. Larger game have become extinct. The rivers and seas teem with fish, the former abounding in members of the carp and salmon tribes.

Agriculture, etc.—Agriculture is of great importance in G.; scientific methods of farming are encouraged by the govts. and extensive use is made of locally produced fertilisers. In 1937 over 71,000,000 ac. were under cultivation, and G. was about 80 per cent self-sufficient in agric. produce. In 1955 there were in the Federal Rep. some 20,400,000 ac. of arable land, 13,900,000 ac. of pasture land, and 1,310,000 ac. of vineyards, orchards, and market gardens. In the ter. of the Ger. Democratic Rep. (where many of the greatest pre-war demesnes were situated) large estates, representing some 40 per cent of agric. land, have been divided up without compensation and distributed among landless peasants, farm workers, and refugees from the dists. now under Polish administration. In 1953 there were 12,550,000 ac. of arable land in the Democratic Rep. Rye and oats grow in the N., despite the drawbacks of poor climate and soil. Flax, hemp, and beet are grown in the central and Baltic areas. The vine covers the dry, sunny slopes of the Mosel, and is also grown along the Rhine. The rich alluvial soils of the sheltered valleys in the SW. are also favourable to the production of tobacco and hops. In 1956 the area under cultivation (in ac.) and the yield (in metric tons) for the chief crops in the Federal Rep. were: wheat, 2,882,000; 3,487,000; rye, 3,864,000; 3,898,000; barley, 2,127,000; 2,310,000; oats, 3,282,000; 3,419,000; potatoes, 2,837,000; 26,756,000; beet, 672,000; 8,346,000. The yield (in metric tons) of the chief crops in the Democratic Rep. in 1955 was: wheat, 1,273,000; rye, 2,464,000; barley, 983,000; oats, 16,603,000; linseed, 15,400; beet, 6,145,000; potatoes, 12,106,000. Livestock in the Federal Rep. at the end of 1955 numbered: pigs, 14,593,000; cattle, 11,553,000; sheep, 1,188,000; horses, 1,099,000; goats, 766,000; poultry, 52,302,000. The figures for the Democratic Rep. in 1956 were: pigs, 8,325,600; cattle, 3,718,500; sheep, 1,892,800; horses, 641,400; poultry, 23,090,600.

Forestry is state controlled. As would be expected, the boisterous winds from the sea dwarf the scanty trees in the NW., the land being covered for the most part with moors and heaths. Trees are still plentiful in the Black Forest and the Thuringian Forest. Chief among the deciduous trees are the beech and the oak. The Scots pine is ubiquitous, and the white birch is important. In 1955 the

forest area in the Federal Rep. was 17,500,000 ac., and in the Democratic Rep. 7,250,000 ac. The yield of sea and coastal fisheries in the Federal Rep. in 1955 was 751,300 metric tons. In the same year the fishing fleet of the Federal Rep. consisted of 217 steamers, 100 luggers, and 1500 cutters.

Resources and Industry.—G. is rich in minerals, especially in coal. The industrial prosperity of the country was built on the fact that the deposits of coal and the, smaller, deposits of iron were found together, and, moreover, in proximity to navigable water-courses. The chief coal mines are in North Rhine-Westphalia, where they were the reason for the development of the great steel-producing area of the Ruhr (q.v.) basin. Coal is found also in the Saarland, in Lower Saxony, and around Zwickau and Dresden (q.v.). Lignite is mined in North Rhine-Westphalia, in the Alpine foothills, and in the neighbourhood of Halle and Leipzig (q.v.). Iron comes chiefly from the Westervald, from Lower Saxony (SW. of Brunswick), and from the Harz Mts (q.v.). In the Harz Mts, also, copper, silver, and molybdenum are found. There are extensive salt deposits (Berchtesgaden, Bad Reichenhall, q.v.), and there are many well-known mineral springs (Baden-Baden, Wiesbaden, Ems, Bad Nauheim, etc.). The prin. oilfields are in the Emsland and in Lower Saxony.

The production figures for mineral in the Federal Rep. in 1955 were (in metric tons): coal, 130,728,000 (134,378,000 in 1956); lignite, 90,337,000; iron ore, 15,684,000 (16,928,000 in 1956); potash, 16,107,000; crude oil, 3,147,000; barite, 407,000.

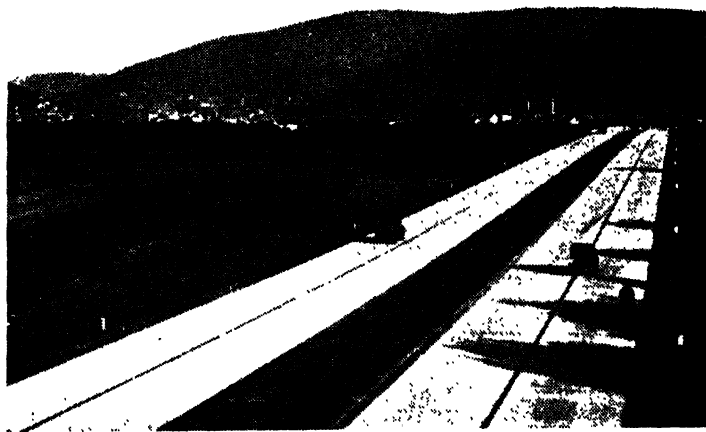
The textile industry is the oldest estab. Important centres of it to-day are Krefeld, München-Gladbach, Wuppertal, Karl-Marx-Stadt (Chemnitz), Plauen, Zwickau, and Zittau (q.v.). The iron and steel industry is concentrated principally in the Ruhr dist., centres being Dortmund, Essen, and Duisburg-Hamborn (q.v.). The restrictions imposed by the Allies at the end of the Second World War on Ger. steel production were removed with the entry into force on 25 July 1952 of the agreement setting up the European Coal and Steel Community. Figures for the production of iron and steel in the Federal Rep. in given years were (in metric tons): pig-iron (1956), 17,576,000 (1938, 15,176,000); steel ingots and castings (1956), 23,187,000 (1938, 17,902,000); rolled products (1955), 14,207,000 (1938, 11,730,000).

In the Democratic Rep. the second 5-year plan, sanctioned on 30 Mar. 1956, set as targets for 1960 (in metric tons): iron-ore, 2,200,000; pig-iron, 2,250,000; steel ingots, 3,500,000; rolled steel, 2,600,000.

The chemical industry of the Middle Rhine has centres at Mannheim, Offenbach, Darmstadt, and Ludwigshafen (q.v.). Other important chemical manufacturing tns are Erfurt, Hanover, Magdeburg, and Halle (q.v.).

The optical and precision instruments of Jena, Wetzlar, and Dresden are well-known, as are the porcelain of Meissen, and the printing and publishing industries of Munich, Stuttgart, and Leipzig (qq.v.). Other industries of importance include the manuf. of motor-cars, jewellery (Pforzheim), locomotives (Kassel), sugar, beer, toys, paper, tobacco, leather, and wooden goods.

Foreign Trade.—The growth of the commercial prosperity of G. during the 19th cent. and the first part of the 20th cent. was extraordinarily rapid, but the First World War, with the subsequent treaty of Versailles, did much to check the expansion. The previous development was due in great measure to the Ger. Customs Union (*Zollverein*), which after 1879 incorporated G. among the protec-



E.N.A.

THE MANNHEIM-HEIDELBERG AUTOBAHN

Industrial production figures for the Federal Rep. in given years were as follows (in metric tons):—

	1936	1955
Gasoline .	492,000	2,977,000
Diesel oil .	120,000	2,938,000
Potassium fertilisers .	546,000	1,697,000
Sulphuric acid	1,058,000	1,861,000
Soda .	425,000	983,000
Cement .	8,526,000	18,769,000
Rayon .	49,200	218,000
Cotton yarn	276,000	373,000
Woollen yarn	47,000	115,000

In 1955 the Federal Rep. also produced 705,418 passenger vehicles, 146,318 commercial vehicles, 1,054,000 bicycles, and 75,779,000,000 k.w.h. of electricity.

The Democratic Rep. in 1955 produced (in metric tons): fertilisers, 377,960; sulphuric acid, 483,205; synthetic rubber, 72,226; and cement, 2,970,000. 28,695,000,000 k.w.h. of electricity, 32,300,000 sq. metres of woollen fabrics, and 200,500,000 sq. metres of cotton fabrics were also produced.

tionist countries. In the latter part of the inter-war years the Ger. economy was geared to the military programme of the National Socialist régime, and foreign trade was affected accordingly. Since the end of the Second World War Ger. overseas commerce has made a remarkable recovery. Textiles, iron and steel goods (including machinery), coal, paper, glass, leather, beer, sugar, precision instruments, and electrical goods are among the chief exports, while grain and flour, raw minerals, textile goods, chemicals, and hides are important imports. The value of the main items of foreign trade in 1955 was as follows:—

Imports:	
processed foodstuffs .	\$1,816,000,000
raw materials .	\$1,732,000,000
Exports:	
finished manufs. .	\$4,822,000,000
semi-finished manufs. .	\$780,000,000

The chief countries to which G. exports, in order of the value of trade, are: Netherlands, Sweden, Belgium, U.S.A., Switzerland, France, Austria, U.K., and Denmark. The chief countries from which G. imports, in order of the value of trade,

are: U.S.A., Netherlands, France, Belgium, Sweden, Italy, U.K., Switzerland, Denmark, Austria.

Communications.—The total length of railway track in the Federal Rep. in 1956 was 25,010 m., of which 1365 m. were electrified. In 1954 the railways carried 1,447,000,000 passengers. The roads of G. were very greatly improved under the Third Reich; the most important development was the construction of some 2000 m. of straight, fast motorways (*autobahnen*) between major cities. In 1955 there were 80,310 m. of roads in the Federal Rep., including 1350 m. of *autobahnen*, 15,140 m. of highways, and 33,180 m. of first-class country road. In 1956 there were 5,672,779 licensed motor vehicles in the Federal Rep.

In addition to these communications G. possesses an elaborate network of canals. By far the most important of these is the Kiel (Kaiser Wilhelm) Canal, which unites the North Sea and the Baltic. The Mittelland Canal, opened in 1938, runs for 273 m. and connects Berlin with the Oder, Elbe, Weser, and Rhine. Other important canals are the Dortmund-Ems and the Elbe-Trave. The total length of navigable rivs. and canals in use in the Federal Rep. in 1956 was 2670 m., and the inland waterways fleet had a tonnage of 4,014,479. Before the Second World War the Ger. mercantile marine stood third among the merchant navies of the world in respect of tonnage and fourth in respect of the number of ships. At that time it had some 2300 ships, with a registered gross tonnage of 4,492,708. At the end of 1956 the mercantile fleet of the Federal Rep. comprised 2433 ocean-going ships with a registered gross tonnage of 3,376,808. Sea-going ships in foreign trade loaded 14,448,145 metric tons in 1954 (14,492,000 in 1936) entering, and unloaded 27,003,028 metric tons (21,638,000 in 1936) clearing, in the ports of the Federal Rep. The civil air-line of the Federal Rep., *Deutsche Lufthansa A.G.* (formed on 6 Jan. 1953, and originally called *A.G. für Luftverkehrsbedarf*) is mainly state-owned, and operates on European, Transatlantic and Near East routes. Its H.Q. are at Cologne.

The *Lufthansa* of the Democratic Rep. operates services between E. Berlin and Moscow and the E. European caps.

The Federal Rep. had in 1955 some 26,700 post offices and 12,000 tele-communications offices. There were 3,686,000 telephones in the country. The number of wireless licences issued was 12,799,000 in 1954, and television licences 84,300.

Population.—In 1939 the pop. of the Ger. Reich was 69,622,483, an increase of 3,454,000 since the 1933 census. The 1939 pop. was distributed as follows: Prussia 41,762,040; Bavaria, 8,280,090; Saxony, 5,206,861; Württemberg, 2,907,166; Baden, 2,518,103; Thuringia, 1,760,595; Hamburg, 1,682,220; Hessen, 1,469,909; Mecklenburg, 910,826; Saarland, 883,736; Brunswick, 599,208; Oldenburg, 582,400; Anhalt, 436,213; Bremen,

400,086; Lippe, 188,598; Schaumburg-Lippe, 54,162. The pop. of Austria (Ostmark) in 1939 was 7,009,014 and that of the Sudetenland, 2,945,261, so that the pop. of Greater G. in that year (excluding Bohemia and Moravia) was 79,576,758.

After the Second World War the area of G. was approximately one-fifth smaller than in 1933, and the pop. (census 1946) was 65,910,999. This figure included some 3 to 4 million refugees.

The present distribution of pop. between the *Länder* and *Besirke* is as follows:—

Federal Rep.	51,595,400
(June 1956)	
Schleswig-Holstein	2,271,000
North Rhine-Westphalia	14,989,500
Rhineland-Palatinate	3,324,900
Lower Saxony	6,541,200
Baden-Württemberg	7,232,100
Bavaria	9,191,800
Hessen	4,603,100
Hamburg	1,792,900
Bremen	628,800
Saarland	988,000
Democratic Rep.	16,692,300
(Dec. 1955)	
Potsdam	1,208,900
Magdeburg	1,445,500
Neubrandenburg	686,700
Halle	2,055,300
Schwerin	651,300
Kotthaus	799,000
Erfurt	1,302,900
Rostock	845,600
Dresden	1,941,300
Karl-Marx-Stadt	2,218,000
Leipzig	1,582,200
Gera	740,700
Suhl	548,600
Frankfurt-an-der-Oder	666,300
W. Berlin (June 1955)	2,195,200
E. Berlin (June 1953)	1,248,000

The pops. of the prin. tns (except for erlin) were as follows in 1956:—

Hamburg	1,792,900
Munich	968,233
Cologne	715,914
Düsseldorf	645,486
Frankfurt/Main	639,076
Essen	630,905
Dortmund	618,305
Leipzig	613,707
Stuttgart	602,928
Hanover	432,247
Bremen	499,900
Dresden	496,548
Duisburg	478,983
Nuremberg	418,950
Wuppertal	405,359
Gelsenkirchen	371,693
Bochum	342,436
Mannheim	280,670
Karl-Marx-Stadt	280,153
Halle	289,680
Magdeburg	261,392
Kiel	257,294
Wiesbaden	250,178
Brunswick	244,479
Oberhausen	239,096

Lübeck . . .	228,766
Karlsruhe . . .	222,556
Augsburg . . .	202,675
Krefeld . . .	198,083
Kassel . . .	192,515
Erfurt . . .	188,112
Hagen . . .	179,240
Bielefeld . . .	172,732
Mülheim . . .	168,280
Solingen . . .	162,826
Münster . . .	155,694
Aachen . . .	151,148
Ludwigshafen . . .	150,200
Rostock . . .	150,004
Monchen-Gladbach . . .	144,826
Bonn . . .	140,761
Zwickau . . .	135,751
Bremerhaven . . .	131,012
Freiburg . . .	128,978
Heidelberg . . .	128,250
Osnabrück . . .	126,586
Darmstadt . . .	124,393
Regensburg . . .	124,124
Recklinghausen . . .	123,538
Oldenburg . . .	120,791
Potsdam . . .	117,571
Romscheid . . .	117,314
Mainz . . .	117,015
Herne . . .	116,137
Bottrop . . .	105,688
Offenbach . . .	104,372
Würzburg . . .	101,725
Wanne-Eickel . . .	101,107
Fürth . . .	101,015
Görlitz . . .	96,147

Religion.—Before the advent of the National Socialist régime in G. it was estimated that about 64 per cent of the pop. were Protestant, the rest being mainly Catholic. Catholicism was strongest in Bavaria and the Rhineland, though there were Catholic minorities elsewhere. Of the pop. of the Federal Rep. (census 1950) 51 per cent are Protestant, and 45 per cent Catholic. It is estimated that in the Democratic Rep. about 80 per cent of the pop. are Protestant, and 12 per cent Catholic. The disestab. of the Church after the fall of the Ger. monarchy had an adverse effect on the strength of the Protestant communions. After the disestab. the Protestants banded themselves together in the 'German Evangelical Church League.' In 1934 an attempt was made to unite the Evangelical churches into a Church under the direction of a Reich bishop, 'called' by the National Synod at the nomination of the heads of the regional churches. The attempt failed, and the State authorities found themselves in conflict with the regional churches. In Sept 1935 a law was promulgated for the security of the 'German Evangelical Church,' giving absolute power in eccles. matters to the Minister for Eccles. Affairs. Throughout 1937 and 1938 the State authorities continued in conflict with both the Protestant and the Catholic Church organisations, the State striving to establish a Ger. National Church closely associated with the paganism of the doctrines of Alfred Rosenberg (q.v.). In 1939 further State control of the Ger.

Evangelical Church was effected by the Minister for Eccles. Affairs, particularly by the order that pastors might be removed from office for 'official reasons' and by the application of the Nazi conception of leadership in Church administration. (In the same year both Catholic and Protestant Churches in Austria were disestab. by the Nazis.) After the war the Nazi-influenced constitution of the Ger. Evangelical Church was abrogated, and a Council of the Evangelical Church in G. (E.K.D.: *Evangelische Kirche in Deutschland*) was created. The Evangelical Church (which is composed of 13 Lutheran churches, 13 United churches, and 2 Reformed churches) was admitted to the World Council of Churches in 1946.

There are 5 Catholic archbishopsrics, and 17 bishoprics. Outside of the E.K.D. there are sev. small Protestant Churches (such as Baptists and Methodists), and there are small numbers of 'Old Catholics' (q.v.) and members of the Society of Friends.

Education.—G. has for long had a high standing in the field of state education, and is known for its systemisation and for the variety and thoroughness of its technical training. Under the Weimar Rep., by a law of April 1920, Ger. children were bound to receive a 4-years' course of instruction after the age of 6 years in the 'foundation school' (*Grundschule*). The next highest school for elementary education was the 'people's school' (*Volkschule*). Besides these, there was the 'middle school' (*Mittlere Schule*), where instruction was given, *inter alia*, in Eng. and Fr. The Republican constitution abolished all private preparatory schools, making the public elementary school common to all. To prepare students for the univs. and for admission to certain professions there were secondary schools with a course of study extending over 8 years (*Gymnasium*). Two other kinds of schools were estab. experimentally---the high school (*Deutsche Oberschule*) and the *Aufbauschule*, the former specialising in Ger. subjects and modern languages, the latter providing an intensive and curtailed high school education for the more promising pupils of the elementary schools. The univs., with their 4 faculties of theology, law, medicine, and philosophy, were the centres of intellectual life. Compulsory religious education, common to all schools during the Empire, was replaced during the Rep. by optional classes in religion at the discretion of the parents. On his accession to power Hitler promised absolute equality in education to all Germans. This promise was not kept, and secondary education steadily declined under the Third Reich. Less than 20 per cent of the Ger. people had completely free education. After the Second World War one of the first tasks of the Allied Control Council was to 'denazify' the schools. In the Third Reich the whole system of education had been geared to the Nazi doctrine, and text books and teaching had

been falsified to that end wherever necessary. Teaching staff had therefore to be renewed and proper text-books provided. By Oct. 1945 schools were open in all 4 zones of occupation.

Throughout G. all children between the ages of 6 and 14 are obliged to attend a recognised school. The Lat. script, instead of the Gothic, is used in all schools (since 1941).

In 1955 there were in the Federal Rep. 29,465 elementary schools, 806 middle schools, 1572 secondary schools, and 1001 special schools. In the *Länder* of Schleswig-Holstein, Hamburg, and Bremen there were 467 unified schools, combining elementary, middle, and secondary education. There were also some 7900 full-time and part-time vocational schools. The following univs. are situated in the Federal Rep. (date of foundation given in brackets): Berlin (1948), Bonn (1818), Erlangen (1743), Frankfurt-am-Main (1914), Freiburg (1457), Göttingen (1736), Hamburg (1919), Heidelberg (1386), Kiel (1665), Cologne (1382), Mainz (1477, 1946), Marburg (1527), Munich (1472), Münster (1780), Tübingen (1477), Würzburg (1582). In the winter semester 1955-6 the univs. were attended by 85,914 students. The Federal Rep. has also 12 Rom. Catholic theological colleges, 7 technical colleges, a mining academy (at Clausthal-Zellerfeld), a veterinary college (at Hanover), 4 Protestant training colleges, an agric. college (at Hohenheim), a college of social sciences (at Wilhelmshaven), an academy of athletics (at Cologne), 10 academies of music, 9 academies of art, and commercial colleges.

In the Democratic Rep. there were in 1955, 11,007 elementary schools, 824 secondary schools, 1354 vocational schools, 61 teachers' training colleges, and other educational institutions. The following univs. are now in the ter. of the Democratic Rep. (date of foundation given in brackets): Berlin (1809), Greifswald (1456), Halle (1694, amalgamated with univ. of Wittenberg 1817), Jena (1558), Leipzig (1409), Rostock (1419).

Finance.—The budget of the Federal Rep. for the year 1956-7, ending 31 Mar., showed (in DM 1,000,000):—

Revenue

Federal taxes and Federal share of income and corporation taxes	25,906
Postal services	255
Coinage	38
Withdrawal from occupation cost carry-over reserve	2,282
Withdrawal from budget equalisation reserves	1,738
Other (including loans)	2,427
Budgetary revenues proper	32,646
Transferring and appropriated items	2,376
Total revenue	35,022

Expenditure

Defence	11,902
Social charges (from war)	6,912
Other social charges	3,852
Financial assistance to Berlin	950
Price equalisation for imported foodstuffs	50
Housing	1,255
Debt service	1,306
Other	7,015
Less Savings under '10 per cent clause' of Budget Law	- 696
Budgetary expenditure proper	32,646
Transferring and appropriated items	2,376
Total expenditure	35,022

On 16 Sept. 1953 agreements came into force settling G.'s external debts. Claims arising from post-war economic assistance given to G. were settled as follows: the U.K. to accept £150,000,000, without interest, to be repaid in 20 equal ann. instalments; France to accept \$11,840,000, without interest, to be repaid in Fr. francs in 20 equal ann. instalments; the U.S.A. to accept about \$1,200,000,000, bearing interest at 2½ per cent per annum, to be repaid in 35 ann. instalments. The Federal Rep. is also to pay DM. 4,000,000,000 in settlement of pre-war debts, mainly to the U.S.A., U.K., France, and Switzerland; DM. 3,500,000,000 are to be paid in settlement of private debts. In pursuance of an agreement signed at Luxembourg on 10 Sept. 1952 the Federal Rep. is to pay DM. 3,000,000,000 to the State of Israel, and another DM. 450,000,000 in respect of the 'Conference on Jewish Material Claims against Germany.'

In accordance with laws issued by the governors of the Brit., Fr., and Amer. occupation zones in June 1948, the *Reichsmark* was replaced by the *Deutsche Mark*. In July 1957 a Federal Central Bank (*Deutsche Bundesbank*) came into being in the Federal Rep. to replace the Bank of the Ger. Länder (*Bank Deutscher Länder*), created in 1948, as well as the central banks of the Länder. The Federal Central Bank will regulate the circulation of notes and the supply of credit within the Ger. economy. The gov. of the Federal Rep. resumed the right of coinage in July 1950. At the end of 1956 the coinage in circulation amounted to DM. 1,068,000,000.

In the Democratic Rep. *Reichsmark* notes were exchanged for *Deutsche Mark* (East) in June 1948. A 'German Bank of Issue,' set up in Berlin, was empowered to issue the new notes. The circulation of notes and coins in mid 1955 amounted to DM. (E.) 4,671,000,000. On 13 Oct. 1957 all paper currency was suddenly withdrawn from circulation, and existing bank notes were changed at par for new notes up to the amount of DM. (E.) 300. Sums in excess of DM. (E.) 300 were credited to special bank accounts to be

released later, provided that there was no suspicion that they were 'of speculative origin.'

Since Nov. 1953 the DM. (E.) currency has been based on gold, the gold content of a DM. (E.) being fixed at 0.399902 grammes. This fixation has not been recognised by the International Monetary Fund; it would mean a relationship of DM. (E.) 1 = DM. (W.) 1.89, whereas, in fact, in recent years the relationship has varied between DM. (E.) 4 to 5 = DM. (W.) 1.

Justice.—Ger. civil law, a model of codification, was first assembled in 1887, and after revision became law in 1896. At the same time an entire transformation of the commercial code and the code of civil procedure was effected to bring them into harmony with the civil code, and these codes came into force in 1900. A further revision of the code of civil procedure took place in 1924. The code of criminal law was revised in 1876. The arrangement of the civil code was based on Rom. law, which, in a modernised form, was the 'common law' of G. before the introduction of the civil code. The code is divided into 5 books: the first is general; the second, third, fourth, and fifth books treat of the 'law of obligations,' the 'law of things,' 'family law,' and the 'law of inheritance.' The commercial code was compiled in 3 divs.: the first dealing with mercantile trade generally, the second with mercantile partnerships, and the third with mercantile transactions. There is no actual guide to the interpretation of Ger. law, but precedent, although theoretically not binding, carries great authority in practice.

Under the Third Reich the Supreme Court (*Reichsgericht*), which had a revisory jurisdiction over all inferior courts, and the People's Courts (*Amtsgerichte*), which were the lowest courts of first instance with petty civil and criminal jurisdiction, became organs of the central gov. A law promulgated in 1935 estab. the novel principle in criminal law that the courts could punish offences under the criminal code if they were considered deserving of punishment 'according to the underlying idea of a penal code or according to healthy public sentiment.' By a later decree (24 Aug. 1942) statutory justice was abolished, and Hitler became the supreme arbiter of law, administering justice through the Minister of Justice and the President of the Secret People's Court.

According to the Basic Law of the Federal Rep., all persons are equal before the law, and no person, whatever his race, nationality, or religion, is to be deprived of his legal rights. Freedom of the individual may be restricted only on the basis of a law, and no one may be prevented from appearing before his lawful judge. A detained person may not be subjected to mental or physical ill-treatment. The police may hold no one in custody for longer than the end of the day of arrest without a decision of a court: the person in arrest must be brought

before a judge, who shall inform him of the reasons for his detention at the latest on the day following the arrest. If detention is to be continued a person in the confidence of the detainee must be notified of the detention forthwith.

The Basic Law provides also that no person may be deprived of his property without due process of law, and in Article 102 the death penalty is abolished.

The chief courts of the Federal Rep. are:

(1) the Federal Constitutional Court, which decides the interpretation of the Basic Law where there is doubt of the compatibility of a Federal or *Land* law with the Basic Law. It has also jurisdiction in disputes between the Federation and the *Länder*, or between different *Länder*; (2) the Supreme Federal Court, which has jurisdiction where its decision would be of importance in the interests of the uniformity of the administration of justice by the higher federal courts; these have ordinary, administrative, labour, financial, and social jurisdiction.

Extraordinary courts are forbidden.

Defence.—After the Ger. defeat in the First World War the law of 30 Dec. 1920 reconstituted the Ger. Army at the strength allowed by the treaty of Versailles (q.v.). The limit was 100,000 men, of which no more than 4000 were to be officers, the men serving for 12 and the officers for 25 years. Only a certain number of discharges were allowed each year to avoid the formation of a reserve force of men who had undergone military training. The former Ger. general staff was proscribed, but in spite of this Gen. von Seeckt (q.v.) was given the rank of commander-in-chief of the Reichswehr. The federal armies were abolished, but a decentralised body of police (*Schützpolizei*) was formed, trained on military lines. By the Boulogne note of 22 June 1920 the number of police permitted to G. was fixed at 150,000, of which 85,000 were allotted to Prussia. By the same terms the police were allowed 1 rifle to every 3 men, a machine pistol to every 20 men, and 1 armoured car to every 1000 men. In addition to the police there was an armed citizen guard called the *Einwohnerwehr*. This force was disbanded owing to allied pressure after the Kapp (q.v.) *putsch* in Aug. 1920, but the Bavarian *Einwohnerwehr* remained. Conscription for the Ger. Army was abolished. Under the Nazi regime, however, the obligations of the treaty of Versailles in respect of armaments were repudiated (16 Mar. 1935), and conscription was reintroduced. The army was accordingly expanded, and by 1938 it was made known publicly that the army comprised 39 infantry divs., 4 light divs., 5 armoured divs., 3 mt. divs., and a cavalry brigade. An infantry div. was reckoned to number approximately 15,000 men, and the total armed forces were estimated at nearly 900,000 men, excluding reserves. On mobilisation on the outbreak of the Second World War a conservative estimate was double this number of men. By 1944 it was estimated that

there were over 300 divs., including 50 armoured divs., and in Oct. of that year the *Folksturm* (q.v.) was also brought into existence on the lines of the Brit. Home Guard. Following G.'s unconditional surrender on 5 June 1945 the work of demobilising and disarming the Ger. Army was put in hand by the Allied Control Commission, and was largely completed by the end of 1946.

The treaty of Versailles restricted the Ger. Navy to 6 battleships, 6 cruisers, 12 destroyers, and 12 torpedo boats, while submarines were prohibited. These restrictions were disregarded and were virtually replaced by the Anglo-Ger. Naval Agreement (1935), which allowed G. a maximum tonnage equal to 35 per cent of the Brit. tonnage for each class of vessel with the exception of submarines in which parity was permissible with, however, a corresponding reduction in other classes. G. entered the Second World War with 3 so-called 'pocket battleships,' the *Deutschland* (later renamed the *Lützow*), *Admiral Graf Spee* (q.v.), and *Admiral Scheer*, each of 10,000 tons, heavily armed and with a cruising range of 10,000 m. In addition the *Meisenau* and the *Scharnhorst*, battleships of 26,000 tons, were completed in 1938. Three battleships of 35,000 tons were also under construction. There were 6 light cruisers and 2 of 10,000 tons—the *Admiral Hipper* and the *Prinz Eugen*. Destroyers and torpedo boats numbered about 40. At least 50 submarines were in commission, built since 1935 when building was resumed. At the end of the war the surviving ships of the Ger. fleet were distributed between Great Britain, France, U.S.A., and U.S.S.R. The *Prinz Eugen* and the *Nürnberg*, which were the only 2 surviving cap. ships, were allotted to the U.S.A. and the U.S.S.R. respectively.

G. under the Nazi regime built a formidable air force in defiance of the provisions of the treaty of Versailles. Its size was not revealed, but it was estimated at the outbreak of the Second World War that there were over 3000 first-line aircraft. Later the *Luftwaffe* consisted of 420 squadrons, each with 12 aircraft, including reserves; it was disbanded at the end of the war.

The Paris treaties, which came into force in May 1955, provided for a contribution by the Federal Rep. to W. defence within the framework of the North Atlantic Treaty Organisation (q.v.) and the Western European Union. The Constitution of the Federal Rep. was amended in 1955 to make this possible. The Federal Defence Force (*Bundeswehr*) was designed to have by the beginning of 1958 a total strength of 120,000 all ranks; 3 motorised infantry divs., 2 armoured divs., and the nuclei of an airborne div. and a mt div. were to be provided. The new Federal Ger. Navy consists of patrol boats, minesweepers, escort vessels, fishery protection vessels, tugs, and surveying vessels. The revived *Luftwaffe* was planned eventually to consist of 100,000 officers and men, in 20 wings.

In the Democratic Rep., legislation of Jan. 1956 provided for the creation of a Defence Ministry and a 'People's Army.' The army is organised in 3 army groups. The navy of the Democratic Rep. consists of escort, patrol, minesweeping, torpedo, and surveying vessels. An 'Air Police,' estab. in 1950, had a strength of about 8000 in 1955.

Oversea Possessions.—G. pursued a vigorous colonial policy from the time of Bismarck (q.v.), but by the treaty of Versailles (q.v.) the Ger. colonial empire was entirely destroyed. During the First World War all Ger. colonies fell into the hands of England, France, and Japan; secret treaties were in existence providing for the occupation of the colonies in the event of an allied victory. The treaty of Versailles disposed of the colonies as follows: the *Kamerun* was divided into the New Cameroons (107,000 sq. m.; native pop., 2,800,000), which was incorporated into Fr. Equatorial Africa, and the Old Cameroons, which were placed, in part, under a Fr. mandate (166,489 sq. m.; pop. 3,000,000) and in part under a Brit. mandate (31,000 sq. m.; pop. 555,000). As 'B' mandates of a similar class, 22,000 sq. m. of Togoland (pop. 747,000) went to France and the remaining 12,600 sq. m. (pop. 185,000) to Great Britain. Former Ger. East Africa was renamed Tanganyika Ter. and became a Brit. possession, Ger. SW. Africa was awarded to the Brit. Union of South Africa; New Guinea (Ger. Kaiser Wilhelm Land, Bismarck Archipelago, and Ger. Solomon Is.) to Australia; Ger. Samoa to New Zealand; Nauru Is. to Great Britain; and the Caroline, Marshall, Marianne, and Pelew Is. to Japan, which country received also Kiao-Chau.

Political Parties.—In the general elections of Sept. 1957 in the Federal Rep. only the 4 main political parties obtained seats. They are:—

The Christian Democratic Party (C.D.U.), which stands for united action between Catholics and Protestants for the rebuilding of Ger. life on a Christian basis, while guaranteeing the freedom of the individual and the possession of private property.

The Social Democratic Party (S.D.P.), a Socialist party.

The Free Democratic Party (F.D.P.), a party of the Right, which has also a radical wing.

The German Party, also a Right-wing party; a 'national party of the Right.'

The election returns were:—

Party	Seats	
	1957	1953
Christian Democratic party	270	244
Social Democratic party	169	151
Free Democratic party	41	48
Ger. Party	17	15

The 12 other parties, which secured no seats in the 1957 elections, included the *Refugee Party* (B.H.E.), which occupied 27 seats in the previous *Bundestag*. The *Communist Party* was dissolved in Aug. 1956, after it had been declared unconstitutional by the Federal Constitutional Court. The neo-Nazi *Socialist Reich Party* had previously (1952) been declared unconstitutional, and banned. The neo-Nazi *German Reich Party* polled 307,881 votes in 1957, compared with 295,615 in 1953.

Constitution and Government.—The Constituent Assembly of the ter. now known as the Federal Rep. of G. met in Bonn on 1 Sept. 1948 and produced a Basic Law, which was approved by a two-thirds majority of the assemblies of the participating *Länder* and which became effective on 23 May 1949.

The Basic Law (*Grundgesetz*) consists of a preamble and 146 articles. The opening articles guarantee the dignity of man, his right to the free development of his personality, the equality of all before the law, and the right to freedom of faith and conscience. Men and women have equal rights, no one is to be prejudiced because of sex, descent, race, language, homeland, faith, or religious and political opinions. No one can be forced against his conscience to take part in combatant duties in war. Freedom of assembly and of associations are guaranteed, as are freedom to express opinions, and freedom of the press and of reporting by radio and cinema. Marriage and the family are to be protected; parents have a right to determine the care and upbringing of their children. Schools are to be provided by the state; religious instruction in schools will be given but not against the wishes of parents. Dwelling-places are inviolable, and can be searched only by order of a court. No one may be deprived of his citizenship if this would make him stateless. Persons suffering from political persecution have a right to asylum.

G. is a federal rep. (article 20) and a democratic and social state. Each *Land* is to have its own constitution, which must conform to the principles of the republican, democratic, and social state, based on the rule of law. All dists. and pars., as well as *Länder*, must have a representative assembly resulting from universal, direct, free, equal, and secret elections. Federal law supersedes *Land* law where they conflict. Every German has the same rights and duties in each *Land* of the Rep. Political parties may be freely formed, but their internal organisation must be democratic. Parties aiming at harming or abolishing the free and democratic basic order or aiming to jeopardise the existence of the Federal Rep., are unconstitutional (article 21). Activities tending to disturb the peaceful relations between nations are unconstitutional, in particular preparations for aggressive war. The Federal Rep. may, however, join in a system of mutual collective security intended to preserve the peace.

Länder are to be organised with due regard to regional unity, territorial and cultural connections, and economic and social considerations.

Any citizen of 21 years of age may vote in elections, and any citizen over 25 years of age is eligible for election.

The organs of the Federal Rep. are:—

1. The Federal Diet (*Bundestag*), elected in universal, direct, free, equal, and secret elections for a term of 4 years.

2. The Federal Council (*Bundesrat*), which consists of members of *Länder* govs. Each *Land* has at least 3 votes; *Länder* with more than 2,000,000 inhab. have 4; and *Länder* with more than 6,000,000 inhab. have 5. The votes of a *Land* can be given only as a block vote.

3. The Federal President (*Bundespräsident*), is elected by the Federal Assembly for a term of 5 years. He is the Rep.'s representative in international affairs. He may be re-elected once.

4. The Federal Assembly (*Bundesversammlung*), consists of the members of the *Bundestag* and an equal number of members elected in proportional representation by the popular representative bodies of the *Länder*.

5. The Federal Gov. (*Bundesregierung*) consists of the Federal Chancellor, elected by the Federal Diet on the proposal of the Federal President, and the Federal Ministers who are appointed and dismissed by the Federal President on the proposal of the Federal Chancellor.

Federal laws, after being passed by the Federal Diet and adopted, are submitted to the Federal Council, which has a restricted veto. The Basic Law may be amended only upon the approval of two-thirds of the members of the Federal Diet and two-thirds of the votes of the Federal Council. The Federal Rep. has exclusive powers of legislation in the following matters: (1) foreign affairs; (2) federal citizenship; (3) freedom of movement, immigration, etc.; (4) currency, weights and measures, regulation of time and calendar; (5) customs, frontier protection, commercial and navigation agreements; (6) federal railways and airways; (7) posts and telecommunications; (8) legal status of persons in federal employment; (9) trade marks, copyright, and publishing rights; (10) co-operation of the Federal Rep. and the *Länder* in the criminal police and in matters affecting the protection of the Constitution, the estab. of a Federal Office of Criminal Police, and the combating of international crime; (11) federal statistics.

The Constitution of the Ger. Democratic Rep. (dated 7 Oct. 1949) was enacted by a provisional People's Chamber, which took the place of the People's Council of the Russian military zone of occupation.

National Flag, etc.—The flag of the Federal Rep. is black (top)-red-gold, in horizontal bands.

The metric system of weights and measures is in general use throughout G.

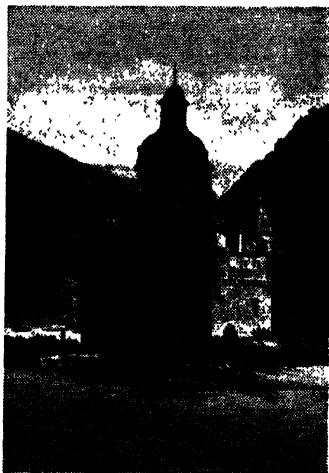
History.—Recorded Ger. hist. begins with the Rom. period. As far back as 113 BC there is mention of certain Germanic tribes, the Cimbric and Teutones, who had to be driven back across the Rom. border. In the course of his Gallic conquests, Caesar came up against the Ger. chieftain, Ariovistus, and banished him and his followers across the Gallic frontiers and beyond the Rhine. In 55 BC Caesar beat back the Suevi and Marcomanni from their settlements in modern Belgium. An attempt in the reign of Augustus to Romanise the Germanic peoples led to a patriotic rising under Arminius, the champion of the Cherusci. From the 3rd cent. onward the N. confines of the empire were continually threatened by the Saxons, Frisians, Thuringians, Goths, Alemanni, and Franks, tribes which every so often built up great confederacies against their common enemy, Rome, and which were obliged to infiltrate into Rom. ter. because of the inroads into their own ter. of the savage hordes of Huns and Magyars. Christianity was estab. in G. in the 7th and 8th cents. Henceforward till the treaty of Verdun (843) G. was occupied by chieftains perpetually at war with one another, except when invasions from outside forced them into transitory alliance. Charlemagne, the Frankish king, was crowned emperor of Rome by the pope in 800, and after his death his empire was partitioned. His grandson, Louis, received the lands between the Rhine and Elbe, known as the 'Teutonic Kingdom of Francia,' or as the 'Kingdom of the E. Franks.' This infant G. consisted not of a single people, but of a number of fairly homogeneous tribes, the Saxons, Swabians, Bavarians, Thuringians, and Franks.

Descendants of the Carolingian Louis ruled over G. till 911, when the line became extinct, and a mass meeting of the Diet, or National Assembly, arrogated to itself the privilege of choosing a king, so that from this time forward G. became theoretically, at least, an elective in place of an hereditary monarchy. Their first choice was Conrad of Franconia. His successor, Henry of Saxony, popularly called Henry the Fowler, founded the Saxon dynasty which lasted till 1024, and was remarkable for the energy of its rulers. In 963 his son, Otto I (q.v.), was crowned emperor of the Holy Rom. Empire at Rome by the pope. From this dates the tradition to which the Ger. rulers jealously clung, that he who had been crowned Ger. emperor at Aachen was entitled also to be crowned king of Italy at Milan and emperor at Rome. (See further under HOLY ROMAN EMPIRE.)

From 1024 to 1125 G. was governed by Franconian emperors. The most noteworthy is Henry IV (1056-1106 (q.v.)), whose humiliation before Gregory VII at Canossa (1075) remains one of the most dramatic episodes in hist. Ever since Otto I had revived the title of Rom. emperor, there had been a rivalry, which daily assumed larger proportions, be-

tween emperor and pope. It became an open quarrel when Henry refused to obey Gregory on the investiture question. The issue was eventually settled by compromise; in Ger. hist. it is primarily important because it started a long period of sporadic civil war.

The most celebrated of the Hohenstaufen emperors who ruled G. 1138-1254, was Frederic I Barbarossa, or 'Red-beard' (1152-90). He had ambitious schemes of It. conquests, but the Lombard League defeated him at Legnano (1176). His successors continued his battles, and so the Guelph and Ghibelline factions,



THE PFALZ OR PFALZGRAFENSTEIN NEAR KAUB, ON THE RHINE

A hexagonal building founded by Emperor Louis the Bavarian (1314-47)

that is, the adherents of the pope on the one hand and of the emperor on the other, spread insidiously all over the empire, so that on the fall of the Hohenstaufens (1254) even the Ger. kingdom had become like the Holy Rom. Empire, a phantom. It was now split up into over 270 virtually independent states.

There now followed an interregnum (till 1273), which is important for the formation of the Hanseatic and Rhenish Leagues. The tns were growing strong and resorted to union as the one defence against the anarchy of the times, and especially against the arbitrary oppression of the great nobles. Theoretically the kingship was still elective, although 4 secular and 3 spiritual princes now claimed exclusive rights to choose the emperor. They gave the title in 1273 to the count of Hapsburg, who accordingly reigned as Rudolf I. Hapsburg was the name of a paltry Swiss principality, yet

the house of Hapsburg was destined to furnish a long and illustrious succession of Ger. emperors. Louis the Bavarian, emperor from 1314 to 1347, was involved in struggles both with his rival Frederick of Austria and with the pope, who refused to recognise his title. Louis gained the support of the Ghibelline faction, and of the electors, who in 1338 stood out for their elective rights, and in the Frankfurt diet denied the necessity of papal approval of the Ger. king's election. For a time allied with Edward III of England against the pro-papal Philip of France, Louis aroused hostility by an acquisitive policy, and was saved only by his sudden death. In 1437 Albert II of Austria was chosen emperor by the 7 electors, and from that date till the dissolution of the empire by Napoleon the imperial crown may be said to have been hereditary in the Hapsburg line.

Maximilian I (1493-1519) was one of the last of the great medieval rulers as he was also in another sense the first representative of a new order; for not only may he be said to have assured the long succession of his own family, but also to have made an earnest effort towards unification and peace. Anxious to check the aggressions of Charles VIII of France, he summoned a Diet at Worms with the result that a perpetual national peace was declared, and an imperial court was established, to see that that peace was maintained. Further, the empire was divided into 10 circles and dists., the object of which was to enforce the execution of the imperial chamber's recommendations.

Behind the death of Maximilian (1519) lie the Dark Ages and in front loom Luther and the Reformation. After Maximilian the steady growth of the free imperial cities shows that the people were building up an active municipal life, whilst the great Gothic cathedrals, like those of Strasbourg and Cologne (begun in 1248), bear testimony to the faith and religious zeal of the masses. But although religion was thus a vital part of the lives of Ger. citizens, the great schism and the abuses produced by the sale of indulgences led to a certain amount of popular anti-papal feeling, though this was fairly limited in application. It was strongest in the univs., where the Renaissance (q.v.) had cultivated religious scepticism. The resentment was set ablaze by Luther (q.v.) in reaction against Tetzel's abuse of the indulgences for the building fund of St. Peter's at Rome. In spite—or because—of the papal bull of 1520, and the great Diet of Worms of 1521, Luther obtained considerable princely support, so much so that a gathering of 7 princes and many cities issued a formal protest against the intolerance of the Second Diet of Spire (1529) and thus became known as Protestants. The emperor, Charles V (1519-56) (q.v.), exercised all his influence to reconcile the opposing religious factions; but the stubbornness on points of detail by the theologians on both sides, and the vested interest of the Protestant

princes who had acquired vast church property in the religious revolution and had no intention of returning it, helped to make a reconciliation impossible. That Luther realised that his religious movement rested primarily on the goodwill of princes and not of the people is shown by his conduct in the Peasants' War (q.v.), when he urged extreme ruthlessness in repressing a popular revolt founded on genuine grievances.

The emperor's position was weakened by his constant need to pacify the Ger. princes of whatever confession in order to gain their help in his external wars. Solyman the Magnificent, the martial Turkish sultan, had already besieged Vienna (1529), and was advancing westward with overwhelming forces to attack the emperor's dominions. Charles lost no time in making a patriotic appeal to the Germans to forget their differences in the face of the common foe, and was soon surrounded with a splendid army, more than sufficient to intimidate the Turks. To the Protestants he had granted provisional toleration by the peace of Nuremberg. The expedition against the Turks at Tunis (1535), the punishment of rebellious Ghent (1539-40), attacks on the Algerian corsairs, and 2 more ravaging wars with the Fr. king, Francis, kept him fully occupied till the treaty of Cr py (1544). But in the year of Luther's death (1546) he began his work of crushing the Protestant league. This proved an easy task, for at the eleventh hour Maurice of Saxony (q.v.), one of the pillars of the Reformation, deserted to the imperial side for purely material reasons; the Protestant forces broke up, and the league melted away. The leaders were executed and fines exacted from Protestant cities. But once his immediate objective was achieved, Maurice went over to the Protestants again; and Francis's successor on the Fr. throne was eager to snatch at any means of humbling his father's rival, and accordingly lent substantial aid to the oppressed Lutherans. At the Diet of Augsburg (1555) Charles was obliged to make notable concessions to his triumphant foes. It was arranged that in future every Ger. prince should be allowed a free choice between the Augsburg confession—which was accepted as a summary of Lutheran orthodoxy—and Rom. Catholicism, and that once his choice was made he should be at liberty to enforce his religion upon his subjects and to drive the latter out of the kingdom should they refuse his faith. This principle of *cuius regio eius religio* was far-reaching, for it precipitated the subsequent religious wars and persecutions of the old religion in the new Protestant states. The Ger. Reformation was considerably influenced by the intervention, at frequent intervals, of Catholic France on behalf of the Protestants—an intervention based on France's fundamental distrust of Hapsburg power. This basic distrust was to affect Franco-Ger. hist. for the next 400 years in varying degrees.

The peace of Augsburg had treated the Calvinists as non-existent, yet in G., as elsewhere, many had come to prefer the confession of Geneva to that of Augsburg. The result was perpetual strife among the various Protestant sects, for the Lutherans showed small mercy to the Calvinists or to any reformers who ventured to follow a different creed from that drawn up by Melancthon (q.v.). After Charles there were 2 moderately enlightened emperors, and then followed Rudolf II (1576-1612), who was a fanatical and bigoted Catholic. Dread of oppression impelled the Protestant states towards mutual alliance, and in 1608 a confederation was duly formed, called the Evangelical Union, the moving spirit of which was the Calvinist Prince Christian of Anhalt. This was followed, in 1609, by a counter-move on the part of the Catholics, who founded the Holy League, at the head of which was Maximilian of Bavaria. It wanted small additional provocation to induce these leagues to fly at one another's throats, and that provocation was given by a band of Protestant nobles of Bohemia, who, infuriated by the vacillating policy of the emperor, marched to the royal castle at Prague, and hurled the 2 imperial representatives and their secretary out of the castle window.

The first chapter in the Thirty Years War (q.v.) (1618-48) was the subversion of the Protestant cause in Bohemia. The second chapter centres on the personality of Christian IV of Denmark, who now came forward to help his fellow religionists, the Protestants. Other notable Protestant leaders on his side were the Ger. prince, Christian of Anhalt, and Count Mansfeld, whilst ranged against them were two of the most formidable generals G. has ever produced, Tilly and Wallenstein (qq.v.). Mansfeld d. shortly after his crushing defeat by Wallenstein at Dessau on the Elbe (1626), and his death was soon followed by that of the Ger. Christian; the Dan. king was utterly vanquished by Tilly at the field of Lutter; the remnants of Lutheranism were wiped out from Austria as well as from Bohemia; Wallenstein swept with his plundering armies over the greater part of N. G., and completed his destruction by breaking the backbone of the once flourishing and influential Hanseatic League. The year 1629 is marked by the retirement from the war of Christian IV, and also by the Edict of Restitution, which restored to the Catholics all the church properties which the Protestants had appropriated since the treaty of Passau (1552). Then appears a second and greater champion in the person of the Swedish king, Gustavus Adolphus (q.v.), the Lion of the N., subsidised from France by Richelieu. This opens the third period of the war. For the time being Gustavus changed the fortunes of the day and twice defeated Tilly, first at the battle of Leipzig (1631), whilst in the course of the second engagement Tilly received a mortal wound. Then Wallenstein met Gustavus at the field of Lützen (1632). Though Gus-

tavus's army was victorious, the king himself was killed in the battle.

The final chapter opened in 1635. The war had now entirely lost its religious character, and had developed into a European contest in which the one object of the combatants was either to despoil the empire themselves, or to hinder their rivals from territorial expansion. At last the peace of Westphalia was arranged, the terms of which were fundamentally prejudicial to the interests and prestige of the empire. France received a great part of Alsace and the 3 Lotharingian bishoprics, Metz, Toul, and Verdun; Sweden received important tracts of land in N. G., to hold as fiefs of the empire, and the independence of Switzerland and of the Netherlands was finally acknowledged. Lutherans, Catholics, and Calvinists were placed on an equal footing, but princes might still impose their own creeds upon their states. A crushing blow was dealt to the empire; for its dismemberment was for the time being sealed by the recognition of the practical independence of the sev. states, which might even contract their own foreign alliances. The war had a crippling effect on Ger. economy, culture, and political development. It is said that the pop. of G. fell during the brief space of 30 years from 30,000,000 to 12,000,000; the proud Hansa cities and their union were broken up; flourishing towns were levelled to the ground, their sites being marked by charred masses and scattered hovels; agriculture was hopelessly neglected, and it was hard to find a stretch of countryside not disfigured nor wasted by the brutal devastations; industries and commercial routes were obliterated, and education, science, and the fine arts languished, and standards of political morality were lost.

The meteoric ascendancy of Prussia took place against this background. Prussia, the name of which was taken from the Borussi, a Slavonic tribe of fierce pagans, lay along the Baltic coast E. of the Vistula. These had been converted and their ter. occupied by the military religious Teutonic order. In 1529 Albert Hohenzollern the Grand Master, declaring himself a Protestant, arrogated the land to himself as a secular duchy which became formally independent of Polish suzerainty in 1660. In 1618 the duchy of Prussia was linked with the electorate of Brandenburg under one Hohenzollern ruler, and when these ters. fell into the hands of the great elector, Frederick William (1640-88) (q.v.), the foundation of the future greatness of Prussia may be said to have been laid. Frederick was an able ruler who determined to make himself felt in European politics. For this purpose he drilled an excellent and permanent military force. It was, however, in the reign of his son, Frederick III (1688-1713), that Prussia achieved the status of a kingdom. Frederick was succeeded by Frederick William I (1713-40), who, in spite of his eccentricities, proved an energetic if brutal tyrant, and left to his son, Frederick the Great (1740-86) (q.v.), a

large, thoroughly disciplined standing army. Frederick the Great was gifted with a genius for war, and it was largely on this that he relied in lifting his little kingdom to the level almost of the great powers in Europe. When the Pragmatic Sanction of Charles VI was disregarded and the possessions of Maria Theresa (q.v.) were assailed, Frederick invaded Silesia. His claim to his conquest was finally acknowledged in the peace of Aix-la-Chapelle, which ended the war of Austrian Succession (1748). The Seven Years War (1756-63), was an unsuccessful attempt to humble Prussia. Maria Theresa had as her allies France, Russia, Saxony, Sweden, and Poland, whilst Frederick could rely only on England, but Eng. subsidies were an invaluable help to him. He defeated the Fr. at Rossbach and the Russians at Zorndorf, but was really saved by the accession to the Russian throne of Peter III, who was his enthusiastic admirer. At the peace of Paris (1763), Frederick came well out of the war; while England gained an overseas empire from it.

Napoleon's victory at Austerlitz (1805) was the death-knell of the Holy Rom. Empire, and Francis II, in 1806, took the much less pretentious title of emperor of Austria. Thus the long line of Hapsburg ascendancy over G. began to come to an end. The confederation of the Rhine (q.v.), that is, a union of 16 Ger. states under the protectorate of Napoleon, was short-lived. The year 1815 saw the federation of 39 petty kingdoms under the nominal presidency of the Austrian emperor. At the time of the revolution in France, July 1830, there was a sympathetic wave of revolt in many quarters of G., but it was not strong enough to extort any lasting concessions from the various courts. Finally the sev. states, with the exception of Austria, entered into a commercial treaty with one another by which they agreed to set up no protective barriers between themselves, but to encourage free trade everywhere within Ger. boundaries. This treaty grew into the famous Customs Union, or *Zollverein*, and was dominated by Prussia.

Once again in 1848, as in 1830, Ger. patriots were stirred to open demonstrations of their dissatisfaction with the existing state of affairs by the tidings of the summary dismissal by the Fr. of Louis Philippe, and their inauguration of another commonwealth. The govts. of the smaller states were at once intimidated into carrying into effect a series of liberal measures. In Austria Metternich (q.v.) was obliged to flee the country, and a representative Diet was summoned whose members were chosen by a popular suffrage. The same process was gone through in Prussia; a national assembly was convened and Frederick William IV swore to observe the new constitution. But the all-Ger. assembly which met at Frankfurt in 1848, with hopes of uniting a liberal G., ended in failure.

William I ascended the Prussian throne in 1861, and it was not long before he

made Bismarck (q.v.) his chief minister. Bismarck realised that G. could never be united under Prussian leadership while Austria still retained some of her old position there. Eagerly he seized on the disputes about the duchies of Schleswig-Holstein as an efficient *casus belli*. In 1863 Austria and Prussia seized Schleswig-Holstein from Denmark, and 3 years later a quarrel about the administration of the conquered provs. led to the Austro-Prussian war that Bismarck had wanted. Austria was totally crushed at the battle of Sadowa, and was debarred once and for all from future participation in Ger. affairs. In 1867 the N. Ger. Confederation (q.v.) was formed under Prussian leadership. Frankfurt, Nassau, and Hanover were now part of Prussia, and the only kingdoms of importance still outside the union were Bavaria, Baden, and Württemberg, that is, the Catholic states of the S. Three years later the S. states fell into Bismarck's hands as a result of the Franco-Prussian war (q.v.). Fear of France was the deciding factor; and in 1871 the N. Ger. Confederation was replaced by the Ger. Empire (*Reich*) with the king of Prussia as emperor. G. was united at last.

Bismarck became Imperial Chancellor (1871). Broadly speaking, his aims were to concentrate all power in the person of the emperor and to fortify his dignity and the dignity of the empire by diverting as large a portion of the national expenditure as he dared towards enlarging and increasing the efficiency of the army. His policy towards the increasingly important Socialists, who were constantly in revolt against his administration, was to disarm their criticism by remedying the evils against which they cried. Thus, those measures for compulsory insurance of workmen and for old age pensions, etc., measures which are sometimes described as state socialism, were really the outcome of the chancellor's recommendations. Bismarck's least successful struggle was with the pope. In 1872 the Jesuits were expelled, and during the next 3 years the May Laws were promulgated, their object being to undermine papal authority and to establish the legality of state interference in eccles. affairs. This struggle, known as the *Kulturkampf*, ended in compromise, and Bismarck was eventually obliged to make substantial modifications in the laws.

The contest between the Reichstag and the chancellor over whether or not the former should retain a constitutional control over the army centres on the 'Septennial' (1874), by which the army grants were fixed for periods of 7 years at a time. The second period would expire in 1888, and Bismarck was determined to make considerable additions to the peace estab. in view of the rapid increase of the Fr. military forces. Parliament stubbornly refused to countenance his plans, and accordingly was dissolved in 1887. In the election that followed Bismarck triumphed; subsequent budgets showed an enormous increase in army supplies,

and the period of conscription was extended. By now, too, G. had aspirations towards colonial expansion. In 1882 a Ger. colonisation society was started at Frankfurt, and from that time date the Ger. acquisitions in Africa and the Pacific, but the colonies did not on the whole prove a successful enterprise from the financial standpoint.

In 1879 Bismarck publicly renewed amicable relations with Austria, and when Italy agreed to join the 2 empires in 1883 there was constituted a triple alliance which lasted down to the First

not affect the basic strength of the movement. While many Ger. Socialists were not Marxists, Marxism did influence Ger. Socialism generally a good deal, and many former Ger. Socialists later formed the nucleus of the Ger. Communist party.

It remains only to note one other salient feature of modern G., and that is her naval policy prior to the First World War. The emperor and his advisers conceived the idea that G. was a world empire, and must have a great navy to defend her trade and exports, on which her whole prosperity depended. This



W. F. Mansell

WILLIAM I OF PRUSSIA PROCLAIMED GERMAN EMPEROR
MIRRORS AT VERSAILLES

THE HALL OF

A painting by Anton von Werner

World War. In his choice Bismarck was guided by the consideration that with Austria at his back there would be less danger of a combined attack of France and Russia.

In 1888 the emperor, William II (q.v.), the grandson of the first Ger. emperor William I (1871-88), ascended the throne with the determination to continue his grandfather's and Bismarck's policy. But it soon became clear that 2 strong personalities such as himself and Bismarck could not work together, and Bismarck resigned in 1890. G.'s industrial expansion continued under his successors, and there was further social legislation. But this did not prevent the steady rise of a strong Socialist party in the country. In the elections of 1912 the Socialists polled more votes than any other party, and various attempts to curb trade-union activities by legislation did

desire for naval expansion was stimulated by the knowledge of the huge fleet which England possessed; for it was felt that, as things were, the supremacy of the latter at sea would confer upon her an overwhelming advantage in the event of open hostilities breaking out. The causes of Ger. antipathy towards England were not far to seek. To begin with both countries had had a similar industrial development; only, as Great Britain had almost a century's start in the field of foreign trade and of manufs., there was in G. the natural jealousy of her rival competitor. Anti-Brit. feeling in G. reached fever heat at the time of the Boer war, and largely accounts for the ease with which the Navy Bill of 1900 was passed, in spite of alarming increase in the naval estimates. Throughout the war the sympathy of the Germans was openly with the Boers; but by 1913 it seemed that the relations

between Great Britain and G. had improved, and hopes were being widely expressed that some arrangement between the govs. might be come to by which the race in naval armaments might be checked, but the Ger. Army Bill of Mar. 1913 raised the total of the forces by 145,000 and put their peace strength in 1914 at some 870,000. During the Austro-Serbian crisis after the murder of the Archduke Ferdinand at Sarajevo, G. at first refused to aid Austria against Serbia, but endeavoured to prevent Russia mobilising in aid of Serbia. There was, however, in G. a div. between the diplomats and the soldiers, and at an important council meeting at Potsdam on 29 July 1914 the latter evidently triumphed. Immediately after this meeting the Ger. chancellor made overtures to the Brit. ambas. to secure Brit. neutrality, but the 'infamous proposals' were rejected. On 31 July G. demanded complete demobilisation of Russia within 24 hrs, but did not require the same measure from Austria. Receiving no reply from Russia, G. declared war on 1 Aug. France stood by her alliance with Russia, but G.'s declaration of war against France did not arrive until 3 Aug. The neutrality of Belgium and Luxembourg was violated by the Ger. armies, and England, receiving no assurances, declared war on G., 4 Aug. (For a fuller account of the war, see WORLD WAR, FIRST.)

The Ger. people showed a remarkable unanimity over the question of war, propaganda concerning the Russian mobilisation rallying all parties, including most of the Socialists, to the support of the gov. policy. As the war progressed the conflict of opinion between 'Easterners' and 'Westerners' became more marked, and the rivalry between the E. and W. commands was a handicap to Ger. military aims. After the battle of the Marne had stalemated the Ger. offensive in Flanders, it was in the E. that Ger. arms were spectacularly successful. The Russians were defeated at Tannenberg, and Rumania in 1916 was put out of the war almost as soon as she had entered it. By the end of 1916, however, it appeared that G. no longer looked forward to a decisive military victory. Peace negotiations were tentatively proposed by the Ger. chancellor on 12 Dec., soon after the defeat of Rumania. The peace offers were rejected by the Allies, and the intervention of President Wilson as arbitrator was cut short by the decision of the Ger. militarists to pin their faith to the submarine. The 'sink at sight' U.-boat campaign which brought America into the war against G. was at first comparatively successful, and this, combined with the disaffection of Russia, made Ger. prospects brighter at the beginning of 1917. Austria however, since the death of Francis Joseph in Nov. 1916, was anxious for peace, but the Emperor Charles was unable to come to terms with Italy, and Austria was forced back into line with G. (see also AUSTRIA-HUNGARY).

Domestic affairs in G. were now

becoming increasingly disturbed. The Minority Socialist agitation towards peace and parl. reform was now joined by the Majority Socialists. At the beginning of 1918 there was a strike in the munition factories, fostered by the Spartacists (q.v.). It was suppressed, but by June it was admitted by von Kuhlmann, secretary of state for foreign affairs, that the war could not be ended by a military success. At the eleventh hr the Liberal-minded Prince Max of Baden was called upon by the Kaiser to form a Cabinet and introduce truly parl. gov. After the failure of Ludendorff's final offensive Prince Max signed the petition for an armistice. On 5 Nov. 1918 conditions were announced, and included evacuation of all occupied ter., withdrawal beyond the Rhine, together with a neutral zone on the R. b., and the surrender of all guns, aeroplanes, and ships. The naval mutiny at Kiel which had broken out on 4 Nov. marked the collapse of the will to war, and on 9 Nov. a rep. was proclaimed in Berlin. The same day the Kaiser abdicated and fled to the Netherlands. A provisional gov. under Ebert (q.v.) replaced that of Prince Max, and the terms of the armistice were accepted. The Majority and Minority Socialists united in this gov., and in Jan. 1919 crushed an attempted Spartacist revolt in Berlin, during which Rosa Luxemburg and Liebknecht, the leaders of the Spartacists, were killed.

On 19 Jan. the election was held for the National Assembly, which was summoned to meet on 6 Feb. The assembly met at Weimar, and after deliberation and amendment the provisional constitution was adopted. Ebert was elected president, while Scheidemann formed a Coalition Cabinet, containing 8 Majority Socialists, 4 Democrats, and 3 of the Centre party. The new gov. attempted some financial rehabilitation, but all measures were unstable, pending the presentation of the allied terms of peace. These were received by G. on 7 May. There was an immediate outcry against their acceptance. They involved tremendous sacrifices of ter., the payment of reparations in money and produce, and also complete disarmament. Scheidemann resigned, and Bauer formed a gov. for the purpose of accepting the terms with reservations over the question of the admission of G.'s war guilt and the surrender of the so-called 'war criminals.' The Allies rejected the reservations, and demanded unconditional acceptance. This was at length forthcoming, and G. signed the treaty of Versailles (q.v.), which came into force from Jan. 1920. The terms of the treaty were so severe that the gov. which had accepted them became unpopular in the country, and this unpopularity was fostered not by the Communists, whose hopes had been destroyed at Weimar, but by the reactionaries—disbanded soldiers and royalists. A counter-revolution, known as the Kapp putch, began in Mar. The gov. fled to Stuttgart, but within a week the revolt was suppressed.

After the Kapp *putsch* chancellor Bauer lost his prestige, and was succeeded in May 1920 by Müller, with Wirth as finance minister. The Müller Gov. paved the way for the general elections of 6 June, in which the Socialists lost ground. A Coalition Gov. was formed on 20 June, with Fehrenbach as chancellor. The prin. work of this ministry was in connection with reparations. G. received the estimated allied demands at the conference at Spa in July, and for the next 10 years the question of reparation payments dominated the foreign policy of G. (see under REPARATIONS). At this time also the allied demands for disarmament to within the treaty limit of 100,000 men became pressing, and were the basis of the Paris terms of Jan. 1921. They were countered by a widespread secret traffic in armaments and the formation of societies devoted to the purposes of military training. Foreign affairs at this time centred also on the Silesian plebiscite in which G. polled some 700,000 votes to Poland's 500,000, while 664 coms. were for G. and 597 for Poland. In May the London ultimatum with respect to reparations was presented to G., and Wirth succeeded Fehrenbach as chancellor of a gov. prepared to accept the ultimatum. As a result, however, of the Silesian award and the fall of the mark consequent on the effort to meet reparation requirements, G. by July 1922 was no longer able to cover her obligations, and the following year the Ruhr dist. was occupied by Fr. and Belgian troops.

This drastic move, however, had been preceded by allied conferences, the chief of which was at Cannes at the beginning of 1922, but the effort to recognise G.'s limitations was thwarted by the recall of Briand to Paris. At the economic conference at Genoa which followed in April G. secured some definite result by concluding a treaty with Soviet Russia, renouncing mutual indemnities and conceding economic advantages, and this treaty further antagonised the Fr. The Ger. policy of passive resistance to the Fr. occupation of the Ruhr was initiated by chancellor Cuno, who succeeded Wirth in Nov. 1922. With the failure of the Ger. policy in the Ruhr to secure anything except impoverishment of the country, Cuno went out of office, and Stresemann came forward and formed a Cabinet in Aug. 1923. The problems which confronted him were to liquidate the struggle in the Ruhr, to restore internal order, and to stabilise the mark. The order for passive resistance was withdrawn on 27 Sept., and this step was only opposed by Bavaria where a separatist movement was aiming at the restoration of the Bavarian monarchy and the overthrow of the Ger. rep. It assumed serious proportions, but was divided into 2 parties, one purely monarchist under von Kahr, the other Fascist under Hitler and Ludendorff. Owing to this div. the plans of both parties miscarried. In Saxony also there was a revolt against the Rep. on the part of the Communists, and a Republican Prole-

tarian Gov. was set up. Stresemann issued an ultimatum, ordering this gov. to resign, and appointed a military commissioner with dictatorial powers. To cope with the financial problem Stresemann inaugurated a Powers Bill which would give him special powers to act on his own initiative while keeping within the bounds of parl. gov. A second Powers Bill was later passed. Economic stabilisation was further helped by the introduction of the Dawes plan (q.v.), which secured the evacuation of the Ruhr and put the question of reparation payments on an economic basis. The London Conference in 1924, at which the Dawes plan was adopted, paved the way for the Locarno treaties (q.v.) the following year, and for G.'s entry into the League of Nations in Sept. 1926.

On 20 Oct. 1924 the Reichstag was dissolved, and at the subsequent elections in Dec. the extremist Communists and Nationalists both lost a number of seats. During this period of transition towards more stable conditions, President Ebert d. Feb. 1925, and was succeeded by Hindenburg (q.v.). Luther was now chancellor, and Stresemann, who was foreign minister, concluded the Locarno treaties with France, Belgium, Great Britain, and Italy. The Locarno treaty was followed in April 1926 by a treaty with Soviet Russia much in the spirit of Locarno, but giving assurances that G.'s treaties with the W. powers were not directed against Russia. When Marx became chancellor in Jan. 1927 Stresemann was again foreign minister, and the Locarno treaty and the League of Nations continued to receive Ger. support as a means of securing equality of treatment. In Feb. the Inter-Allied Military Commission of Control was withdrawn, and the chief obstacle was thus removed from the hitherto secret reconstruction of the Ger. Army.

With the fall of the gov. in 1928 the Socialists gained in the ensuing elections, and Stresemann became foreign minister, this time in a gov. with the Socialist Müller as chancellor. In these elections the National Socialist or Nazi party won 12 seats with a total of over 800,000 votes—evidence of the success with which Hitler had built up the party since its eclipse in the Munich *putsch* of 1923. The following year the Young plan superseded the Dawes plan, and the Allies agreed to evacuate the Rhineland by June 1930. The first stage in the reconstruction of G. was thus complete, and the end of the period is marked by the death of Stresemann (3 Oct. 1929), his work largely accomplished.

Stresemann's methods had not, however, been thoroughgoing enough to please the Ger. Nationalist party, which was loud in its denunciation of the Young plan. Hugenberg, the leader of the Nationalists, became allied with Hitler in their joint opposition to the plan, and as a result the financial power of the industrialists and the propaganda machine of the Nationalists were of service in building up the

Nazi party. The Socialist influence waned, and in Dec. 1929 Müller was succeeded by Brüning, leader of the Catholic Centre party. Brüning did not have a majority in the Reichstag, and governed mainly by decree during the 2 years he remained in office. In 1930 the Reichstag was dissolved, and the elections were a triumph for the Nazi party, which gained 107 seats as against their previous 12, with a total vote of nearly 6,500,000. Hitler now sought to consolidate his victory by directing National Socialist propaganda against the Jews and Marxists, the alleged injustices of the Versailles treaty, and the Republican system of gov. The accentuation of the world economic depression of the 1930's resulted in Hitler acquiring a broader basis of support from the hard-hit lower middle classes, and in the succeeding elections Hitler's following grew even larger until, when he stood against Hindenburg in the presidential elections in 1932, he secured over 13,000,000 votes. Hindenburg was nevertheless elected by a majority of 6,000,000, and notwithstanding Hitler's success in the Reichstag elections Hindenburg refused him the chancellorship.

Subsequently, however, the reactionary group around Hindenburg persuaded him to make Hitler chancellor over a mixed Cabinet of Nazis and Nationalists. There is no doubt that they hoped Hitler would prove no more than a compliant figure-head, amenable to the wishes of the non-Nazi Nationalist party (Jan. 1933). But they had set flowing a Nazi tide which was destined very soon to sweep down all barriers. Hitler's first act was to stage the Reichstag fire, the responsibility for which he placed on the Communists. By this means he was able to restrict the activities of both Communists and Socialists at the subsequent elections, for many sincerely believed that he had saved G. from a threatened Communist uprising. He now had the substance of power, and could afford to disregard forms, though, having forcibly expelled the Communist and other opposition deputies, he went through the farce of obtaining from the Reichstag an Enabling Act, whereby he now meant to rule as a dictator, compelling submission by means of troops, concentration camps, and secret police—*Sturmabteilung* (S.A.) and *Schutzstaffel* (S.S.) and *Geheime Staatspolizei* (Gestapo) (see also S.A.; S.S.). His intensive propaganda 3 years previously had made a point of decrying the Republican polity. Now he could give the old constitution its death-blow. Their constitutional liberties gone, no resistance by any elements of the Ger. people could now avail. All opposition parties were suppressed, including the Nationalists, who had naively believed that Hitler would be their tool. As yet, however, Hitler did not show his hand in foreign affairs—apart from the fact that in its general outlines his policy could have been found in *Mein Kampf* (q.v.). For the next few years he intended to consolidate his position by giving the world the impression that he

really believed himself to be the bulwark against Bolshevism (see ANTI-COMINTERN PACT), besides being a respecter of international obligations. He had not, however, disposed of all opposition and the Ger. dictator himself murdered or caused to be murdered those within the Nazi party who still offered resistance. This incident took place on 30 June 1934, when the Socialist or radical-wing leaders of the Nazi party were suddenly arrested and summarily executed. These included Röhm (q.v.), chief of the S.A., the man to whom Hitler was largely indebted for his triumph, and a number of non-Nazis were also executed at the same time.

In Aug. 1934 Hindenburg d., and Hitler became both president and chancellor and, later, adopted the title of Führer, appointing a number of Gauleiters (dist. leaders) or nominees to act in the various provs. or former states of G.

Attention was now focused on the Saar dist., in which a plebiscite was held on 13 Jan. 1935 under the terms of the Versailles Treaty to determine whether this area should return to G. The Nazi propaganda campaign was such that the result was a foregone conclusion, and on 1 Mar. the important mining dist. of the Saar was returned to G. by a majority of over 90 per cent. Hitler's next move (16 Mar.) was to denounce the armament clauses of the treaty of Versailles, and to declare G.'s intention of re-establishing compulsory military service. An army of 550,000 men was planned in place of the 100,000 permitted by the treaty. In the same year (18 June) an Anglo-Ger. agreement on naval ratios was concluded, under which appeasement policy the Brit. Gov. allowed G. to build up to 35 per cent of Brit. naval strength (see NAVY; SEA POWER). G.'s next act was to defy the Locarno Treaty, adherence to which Hitler had himself reaffirmed. Both this treaty and the treaty of Versailles were repudiated when on 7 Mar. 1936 the demilitarised Rhineland zone was re-occupied by Ger. troops. France and Britain made no opposition, their fears in some sort allayed by Hitler's undertaking not to fortify the zone, and by his declaration that 'he had no territorial demands to make in Europe.' Relations between France and G. inevitably deteriorated, particularly as the result of the clash of interests aroused by the Sp. Civil war. The end of the Abyssinian war brought a *rapprochement* between Italy and G., and the so-called Berlin-Rome axis came into being in the autumn of 1936. This was followed on 25 Nov. by the agreement which G. signed with Japan. Announced as a defence against the interference of the Communist international in the internal affairs of the nations, this agreement was viewed as a dangerous military alliance by the rest of the world.

The following year (1937) G. continued to work towards a position of self-sufficiency, and to emancipate herself still further from the Versailles Treaty. The agitation for the return of the former

Ger. colonies was intensified. Intervention on behalf of Franco in the Sp. Civil war also helped to bring G. and Italy into line with each other in a joint policy versus the rest of Europe. The Italy of Mussolini accordingly joined the Ger.-Jap. Anti-Comintern Pact in Nov.

By the spring of 1937 the first phase of Nazi war economy was completed; the point of 'full employment' had been reached through rearmament and an unlimited spending policy. Expenditure on armaments, however, continued to increase, and the requisite resources were obtained partly by reducing the consumption of the people, partly by levying

therefore preceded by a change in the direction of the army and of the Foreign Office. Hitler became commander-in-chief of the army and Keitel was raised to be his chief of staff. On the political side von Neurath (q.v.) gave place as foreign minister to von Ribbentrop (q.v.), until then Ger. ambas. in London. The way was now ready for expansion. In Mar. 1938 Ger. troops invaded Austria, which was occupied without resistance. On 13 Mar. the union of G. and Austria was announced.

Italy's acquiescence in the annexation of Austria served outwardly to strengthen the ties with which she was bound to G.,



E.N.A.

THE GERMAN INVASION OF AUSTRIA, MARCH 1938

A Munich infantry regiment crossing the frontier at Kiefersfelden, in Bavaria

on the Jews and other minorities, and partly by enforced measures of rationalisation and extended hrs of labour (trades unions had long been suppressed). It was now that G., emboldened by previous successes and by the knowledge that she alone among the nations was rearming at top speed, began the policy of piecemeal absorption of European ter. (see further under EUROPE, *History* and WAR, SECOND WORLD). In each case the technique was the same—to trump up charges of ill usage of Ger. minorities or nationals, and stir up disorder with the aid of spies, coupled with the widely disseminated but hollow allegation of the hostile encirclement of G. Steps taken by other nations in self-defence were inevitably construed as proofs of encirclement.

There was, however, still some opposition in G. to Hitler's policy of Nazi domination of Europe. His plans were

and the accord between the 2 countries was affirmed at a meeting between Hitler and Mussolini in Rome during May. Thus Italian support was assured for Hitler's next move against Czechoslovakia. Propaganda was intensified on behalf of the Sudeten Germans in Czechoslovakia, while to protect G. in the W. the fortification of the Siegfried line was hastily erected. In Sept. the crisis came to a head. G. demanded the cession of the Sudetenland under threat of war. These demands were formulated by Hitler at conferences with the Brit. Prime Minister, Neville Chamberlain, at Berchtesgaden on 15 Sept. and at Godesberg on 22 Sept. Finally, on 28 Sept., a conference was held at Munich between Hitler, Mussolini, Chamberlain, and Daladier, at which Hitler gained his demands. The Sudeten Ger. dists. were accordingly occupied and the Czech fortifications taken over. An Anglo-Ger. declaration repudiating war

was signed on 30 Sept., followed in Dec. by a pact between G. and France. Neither of these agreements, however, served to prevent the deterioration of the European situation.

In order to pay for her successive ventures G. fell heavily into debt, and it was with the aim of easing their economic difficulties that the Nazi party organised one of the worst pogroms against the Jews in Nov. 1938. In Mar. 1939 a Ger. protectorate was set up over Bohemia and Moravia, incorporating over 6,000,000 Czechs in the Ger. Reich, while Slovakia was formed into a rep., nominally independent but actually subject to G. This move was accompanied by a trade drive in Rumania and the Balkans, resulting in barter agreements to give G. the foodstuffs so greatly needed in exchange for manufactured articles. Lithuania was forced to cede Memel to G.

On 28 April Hitler denounced the Non-Aggression Pact concluded with Poland in 1934 and also the Anglo-Ger. naval agreement of 1935. To offset the supposed encirclement of G. by Great Britain, France, and Poland, a military alliance was made with Italy, thus openly directing the Berlin-Rome axis towards war. The demand for Danzig became more menacing with the accompaniment of frontier clashes. Hitler was undeterred by the Brit. promise of support for Poland, which he countered by a non-aggression pact with Soviet Russia. This was concluded on 26 Aug., and for the sake of it Hitler outwardly reversed the anti-Communist policy on which hitherto the Nazi state had been largely based. Secure as he imagined from a war on 2 fronts Hitler forced the issue with Poland, which was invaded on 1 Sept. Great Britain and France then declared war on G. on 3 Sept. (For a fuller account of the war, see WORLD WAR, SECOND; and articles on separate campaigns, etc.)

The Polish campaign lasted only a month. G. was, however, forced to agree to Russian annexation of half the Polish ter., while at the same time Russia strengthened her position in the Baltic by securing bases from Latvia, Lithuania, and Estonia. With the spring of 1940 came the period of renewed military success. Norway was invaded on 8 April to protect the transport of iron ore from Sweden, which was essential to Ger. armaments. The invasion of the Netherlands, Belgium, and Luxembourg followed on 10 May. With the occupation of these countries and the surrender of France, fighting in Europe had come to an end by July. Plans were made for the invasion of Britain, but the offensive and defensive successes of the R.A.F. caused these plans to be abandoned. Politically Hitler now sought to maintain his prestige by dictating settlements for the differences which prevailed between Hungary and Rumania, Slovakia and Bulgaria. These countries were accordingly brought within the orbit of G. The New Order in Europe was launched, by

which the economy of each European country was linked to that of G. and made to subserve the aims and ambitions of the master people, the Ger. *Herrenvolk*. Meanwhile it was Hitler's hope to guard against Amer. intervention by means of a 10-year pact with Italy and Japan, concluded on 27 Sept. 1940. The mutual military and economic support which the 3 countries guaranteed to each other in the event of attack by a country not at that time at war was held to be directed towards the U.S.A. It did not, however, serve to hinder Amer. economic aid to Britain. Hitler's New Order meant the subjugation of the peoples of Europe to work for G., and the organisation of foreign labour was pushed forward in order to keep up the supply of men and materials necessitated by the Ger. campaign in Greece and the invasion of Russia, Luxembourg, Alsace-Lorraine, and part of Yugoslavia, formerly belonging to Austria, were incorporated in the Reich during 1941.

Political events which preceded the invasion of Russia on 22 June 1941 were a tightening of the bonds which reduced Bulgaria, Rumania, and Croatia to the status of vassal states of G. Rumania, Finland, Hungary, and Slovakia lent armed aid to G. against Russia. At the same time a pact of friendship was concluded with Turkey. The prolongation of the war bringing reverses to the Germans in Russia and North Africa meant in the Ger. Reich itself an intensification of propaganda to stiffen morale and a tightening of the grip of the Gestapo. The New Order in Europe gave way to Ger. domination, and the appearance of collaboration began to disappear, particularly in relation to France. The persecution of the Christian religion and of the Jews continued. By a decree in 1943 the Jews ceased to have any legal existence. The predominant position of the Gestapo was emphasised by the appointment of Himmler, leader of the S.S., to the post of minister of the interior. His position was further strengthened the following year as a result of the attempt on Hitler's life on 20 June 1944. This unsuccessful plot to destroy Hitler by a bomb explosion was organised by a number of high-ranking officers in the army. Reprisals were severe, and were conducted by Himmler, who became supreme commander of the home army. Defeatism was everywhere ruthlessly suppressed, especially in the face of the Russian advance in the E., and an example was made of high officials, notably the deputy burgomaster of Breslau and the mayor of Königsberg, who were executed in the early months of 1945. In the W. the morale of the fighting forces was rallied for the offensive in the Ardennes, launched by von Rundstedt. In Jan. 1945 the Russian advance again went forward, and the allied offensive in the W. began the following month.

On 1 May 1945 Doenitz broadcast the death of Hitler. It is now generally accepted that Hitler committed suicide

in the last hrs before Berlin fell into Russian hands. Doenitz announced himself as Hitler's successor, but his gov. did not survive the unconditional surrender which Doenitz announced by wireless on 6 May. He was arrested as a war criminal and his gov. dissolved. The official terms of surrender were signed in Berlin in the early hrs of 8 May by Keitel for the Ger. Army, von Friedeburg for the navy, and Stumpf for the air force. G. was divided into zones of occupation, roughly corresponding to the areas conquered by each of the allied armies. The normal life of the country had come to a standstill. Nearly all the large cities suffered severe damage from bombing, and the countryside lost much either as a result of the actual fighting or by the Germans themselves in their retreat. An Allied Control Commission was set up, consisting of the allied commanders-in-chief, Eisenhower representing the U.S.A., Montgomery for Great Britain, Zhukov for the U.S.S.R., and de Latre de Tassigny for France. The commission held its first meeting on 5 June, and announced that it had taken over all powers of gov.

The policy to be followed towards defeated G. was decided by a three-power conference held at Potsdam in July and attended by Truman, Stalin, Winston Churchill, and Attlee (see POTSDAM AGREEMENT). The main decision of the conference was that the political and economic life of the country was to be decentralised. All laws of Nazi origin were to be abolished, and reorganisation of the judicial system and of education was to follow. There was to be complete disarmament and elimination of war potential. The W. frontier of Poland was fixed provisionally on the Oder-Neisse line, thus giving Prussia E. of the Oder and Silesia to Poland, also the S. part of E. Prussia, including Danzig. Königsberg and the N. part of E. Prussia was allotted to the U.S.S.R. As a result of the Potsdam Conference the zones of occupation were given a demarcation slightly different from the areas originally taken up by the occupying armies earlier in the year. The Brit. zone included the Rhur, N. Rhineland, Westphalia, Hanover, Oldenburg, Schleswig-Holstein, Hamburg, Lippe, Schaumburg-Lippe, Brunswick, Heligoland, and the Frisian Is. The Amer. zone included Bavaria, part of Württemberg, Bremen, Waldeck, Hesse, and Hesse-Nassau, and Baden N. of and including Karlsruhe. The Russian zone included Mecklenburg, Brandenburg W. of the Oder, Anhalt, Thuringia, and Saxony. The Fr. zone included S. Rhineland, the Saar basin, the Rhenish Palatinate, Baden S. of Karlsruhe, and part of Württemberg. Berlin was created a fifth zone, divided into occupational areas among the 4 powers. One of the first problems facing the commission was the shortage of food. As great a task was provided by the numbers of homeless and wandering people, displaced persons as they came to be known, a category

numbering some 8,000,000. After some months the majority were settled in their former homes. There remained about 500,000 for which U.N.R.R.A. (see UNITED RELIEF AND REHABILITATION ADMINISTRATION) became responsible.

By 1946 the 4 zones of occupation had hardened almost into the semblance of 2 separate states; the Fr., Brit., and Amer. zones forming a W. bloc, the Russian an E. bloc. In the W. permission was granted for the formation of political parties with the prospect of free elections at a later date. The leading political parties were the Social Democrats led by Schumacher (q.v.), the Communists, and the Christian Democrats under Adenauer (q.v.). Parallel with the growth of political activity went the process of de-nazification. Education was re-started, and a free press set going. In the Russian zone Pieck (q.v.) and Ulbricht, former leaders of the Communist party, returned to Berlin under Russian auspices, the former to become chairman of the party's central committee. Under Russian pressure proposals were set on foot to fuse the Social Democratic party with the Communists. This fusion was formally effected in June 1946, and Pieck and Grotewohl (q.v.), the fusionist leader of the Social Democrat party, became joint chairmen of a single Socialist Unity party, in reality entirely Communist in outlook.

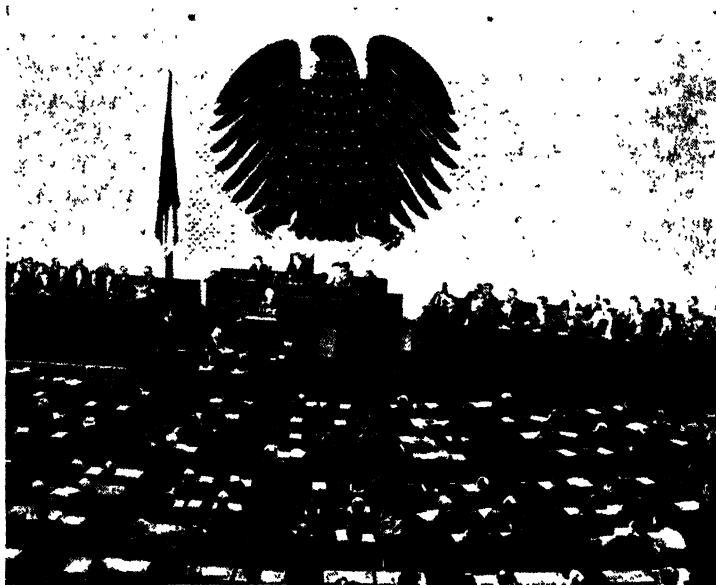
In the Russian zone the large estates of Mecklenburg, Brandenburg, and Saxony were broken up, and land amounting to over 4,000,000 ac. was distributed to some 300,000 families of peasants, including refugees deported from Poland and Czechoslovakia. Administration in the 3 provs. and in Thuringia and W. Pomerania was carried out by representative Ger. govts. set up by the Soviet military authorities with executive, legislative, and judicial authority, while a central administration for the whole zone was created in Berlin. Elections for the prov. assemblies were held in 1946 with the Socialist Unity party in the majority throughout the zone. Municipal elections were held in all 4 zones in various stages throughout 1946—the first free elections since 1932. In the Brit., U.S.A., and Fr. zones the Christian Democrats proved the strongest party, with the Social Democrats a strong second. In the Russian zone the Socialist Unity party had the strongest vote. In Berlin itself the Social Democrats won a victory in the face of strong Communist opposition.

In Dec. 1946 discussions were started between the U.K. and the U.S.A. towards an economic fusion of the Brit. and Amer. zones with the aim of achieving a self-sustaining economy. The project received greater impetus following the failure of the Council of Foreign Ministers at a conference in Moscow in Mar. 1947 to reach agreement on any plan whereby G. could be governed as a single economic unit. By May negotiations between the Brit. and U.S. Govts. led to an agreement which accomplished a full economic

fusion of the 2 zones while maintaining the political independence of the *Länder* govts. concerned. Developments in the Russian zone were more radical. The occupying power continued the transfer of properties to so-called *Altien-Gesellschaften* to acquire Ger. factories, removed vast quantities of goods and equipment to Russia, and rapidly tightened the hold of the one-party regime. Living conditions in the Russian zone were bad and, according to Ger. reports from that zone, worse than in the W., but shortages were

order forbidding all traffic between their zone and the W. Thus began the 'blockade of Berlin' and soon afterwards the Allies' measures to supply their sectors with food and other goods through the 'air lift.'

The W. allies in June recommended that the Germans call together a parl. assembly for W. G. by 1 Sept. The assembly was to work out a constitution by the end of the year and elect a gov. by the spring of 1949. There was considerable doubt in the minds of Ger.



THE BUNDESTAG IN SESSION

Camera Press

aggravated by the hardest winter in living memory.

In London (Dec. 1947) four-power negotiations in the Council of Foreign Ministers broke down on the future of a politically and economically united G. The govts. of Britain, France, and the U.S.A. therefore decided to carry out, without Russia, the political and economic integration of their zones. G. had now become a pawn in the political conflict between the W. world and Russia. As a part of their plan to aid Ger. recovery the W. powers announced a drastic currency reform to apply to their zones but not to Berlin; and on 20 June the Reichsmark was withdrawn and the new Deutsche mark introduced. The Russians countered this move on the same day with an

politicians, who feared that a gov. in W. G. would deepen or perpetuate the E.-W. div. of the country. But subsequently they decided to co-operate with the policy of the W. powers, mainly because the 16 European recovery nations had accepted W. G. as a beneficiary under Marshall aid and this would give a chance of prosperity for G. and the cutting down of the allied reparations demands. The W. Allies wanted a Ger. gov. in the W. because they could not get one for the whole of G. They wanted Germans to administer their own affairs under direct allied control, because they wanted to ease the burden on the taxpayers at home; they wanted the political and economic integration of W. G. because it would be a good bargaining counter in their dealings.

with the Russians; and finally, they wanted an economically prosperous and politically stable G. to play her part in the European recovery programme (see on this *EUROPE, History*).

On 1 Sept. 1948 the Parl. Council met at Bonn to begin the work of drafting a constitution. Its task was made more difficult because the W. Allies had slightly different ideas about the form which the proposed Ger. state should take; and because the status of the W. sectors of Berlin in the new state raised difficulties of a technical nature.

By April, however, the 3 W. powers had largely resolved their difficulties among themselves through the solidarity achieved by the conclusion of the North Atlantic Treaty (see *EUROPE, History*), which was the corollary to the W. Union. The political effect of this treaty for strengthening the mutual defence of the W. nations from external aggression upon Russian opinion was soon manifested, for in the same month the gov. of the Soviet Union informed the U.S. Gov. that it was willing to raise the blockade of Berlin if a definite date were set for a council of foreign ministers to discuss Ger. questions. (The blockade was, in fact, raised in May, though some restrictions remained until Sept. 1949.) It was, however, made clear by the W. powers that the holding of a council would not deflect the 3 govts. from their plans to establish a gov. for W. G. These plans were now easier of accomplishment by reason of the fact that the parl. council at Bonn had come to an agreement over the draft constitution. By 23 May the legislatures of some 8 *Länder* had ratified the Bonn basic law by substantial majorities and the two-thirds majority required before promulgation was thus obtained.

In anticipation of the completion of the basic law, the govts. of the U.S.A., Great Britain, and France had drawn up an agreed memorandum to govern the exercise of their powers and responsibilities in G. following the estab. of a Ger. federal rep. The Allies, who retained the right to take direct action themselves in certain limited fields set out in the Occupation Statute when the Ger. federal rep. should have been estab. Military gov. as such would terminate and the functions of the allied authorities would be divided—control functions being exercised by a high commissioner and military functions by a commander-in-chief. The 3 high commissioners together would constitute an allied high commission—one of whose chief duties would be the unanimous approval of amendments to the federal constitution proposed by the federal gov.

The Federal Ger. Rep., comprising the former Brit., Amer., and Fr. zones, came into existence on 23 May 1949, and the subsequent hist. of W. G. is contained in the article *FEDERAL GERMAN REPUBLIC*. The Soviet Union protested formally at its creation, and on 7 Oct. 1949 the Ger.

Democratic Rep. (q.v.) was estab. in the Soviet zone, and its hist. is dealt with in the article *GERMAN DEMOCRATIC REPUBLIC*.

Various proposals made by the W. powers, the Soviet Union, and the Germans themselves for the proposed reunification of the 2 Ger. states have so far (1958) come to nothing. Federal G. is now linked to the W. powers by economic and military treaties, while the Ger. Democratic Rep. has, since its inception, been one of the most subservient of the Soviet satellites.

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Germinal (month of buds), 7th month of the year in Fr. revolutionary calendar. See CALENDAR.

Germination, development of the embryo contained in the seed into a seedling, in consequence of exposure to the necessary conditions of moisture, warmth, and aeration. The radicle, or root, appears first, and grows vertically downwards; the plumule, or young shoot, then grows upwards, while the cotyledons take an approximately horizontal position.

Germiston, third largest tn in the Transvaal, South Africa, 9 m. from Johannesburg; an important air and railway junction in the heart of the Rand (q.v.) goldfields. The gold refinery is the world's largest. Many secondary industries are sited in G., which is also an educational centre. There are large railway workshops. Pop.: Whites, 50,200; Bantus, 90,395; Coloureds, 2454; Asiatics, 4157.

Gérôme, Jean Léon (1824-1904), Fr. painter, b. Vesoul. In 1841 he became a pupil of Paul Delaroche. In 1847 his 'Young Greeks Cockfighting' was the first of many popular reconstructions of life in the anc. world. In 1855 the State purchased his 'Le Siècle d'Auguste et la naissance de Jésus-Christ', and bestowed upon him the Cross of the Légion d'Honneur. The 'Duel' of 1857 increased his reputation, and the 'Gladiators', 1859, was looked upon as his masterpiece. Among his oriental studies are 'Turkish Prisoner', 'Prayer', and 'Slave Market.' He was also a celebrated academic teacher of art.

Géromé, see GERARDMER.

Gerona: 1. Sp. prov., in Catalonia (q.v.), at the E. end of the Pyrenees, with a coastline on the Mediterranean. It is watered by the Ter and the Fluvià, and has varied physical features, including mt ranges, the plain of El Ampurdán, and the picturesque Costa Brava (q.v.). There is a small detached dist. at Llívia (q.v.). Coal, copper, lead, and iron are found, and there are textile, paper, cork, leather, cement, and fish-curing industries. Area 2265 sq. m.; pop. 328,600.

2. (anc. **Gerunda**) Sp. tn, cap. of the prov. of G., at the confluence of the Oñar and the Ter. It was taken by Charlemagne in 785, and fell to the Fr. in 1809 after a memorable siege. The splendid Gothic cathedral, begun in 1312, is remarkable for the great width (90 ft) of its single nave. There are some Rom. remains. Pop. 38,400.

Gerry, Elbridge (1744-1814), Amer. statesman, b. Marblehead, Mass.; graduated at Harvard in 1762. From 1774 to 1775 he was a member of the Massachusetts Prov. Congress; a member of the Continental Congress, 1776-85, and was a great advocate of the Declaration of Independence. From 1810 to 1812 he was governor of Massachusetts. His administration was marked by the enactment of a law by which the state was divided into new senatorial dists., which gave an unfair advantage to the party in power. From this has arisen the term gerrymander. In 1812 he was elected vice-president of the U.S.A., and was an ardent advocate of war with Great Britain. See J. T. Austin, *Life of Elbridge Gerry*, 1828-9.

Gerrymander, see GERRY, ELBRIDGE.

Gers, dept of SW. France, formed of part of Gascony. Chains of hills (the foothills of the Pyrenees) run from N. to S., and the dept is watered by many rivs., including the G., Baise, Save, and Gimone. Vines are extensively cultivated, being mainly grown for distillation into Armagnac brandy (see BRANDY), and cereals, vegetables, fruit, and tobacco are produced. Stock raising (horses, cattle, and poultry) is important. There is little industry. The prin. tns are Auch (the cap.), Condom, and Mirande (qq.v.). Area 2430 sq. m.; pop. 185,100.

Gershwin, George (1898-1937), Amer. composer, b. Brooklyn, New York. He studied the piano under Charles Hambitzer,

harmony under Edward Kilenyi and Rubin Goldmark. He first had to earn a living as pianist in a jazz shop, but in 1919 made a success with a musical comedy, *La, La, Lucille*. Others included, with mounting success, *Our Nell*, 1923, *Lady be Good*, 1924, *Tell Me More*, 1925, and *Of Thee I Sing* (Pulitzer prize), 1932. More ambitious was the Negro opera *Porgy and Bess*, produced at Boston in 1935, and his greatest success in the concert-room was the first *Rhapsody in Blue*, 1924, for piano and jazz orchestra. (A second appeared in 1931.)

Gerson, Jean (1363-1428), chancellor of the univ. of Paris, and, with Pierre d'Ailly, originator of Gallicanism, i.e. the claim that general councils were superior to the pope. He urged this as a means of healing the Great Schism and largely through his efforts the councils of Pisa, 1409, Constance, 1414, and Basel, 1431, were held. See also KEMPIS, THOMAS A.

Gersonides, or **Levi ben Gershon** (1288-1344), Fr.-Jewish philosopher, mathematician, and physician; b. Bagnols-sur-Cèze in the co. of Orange. Sometimes called **Rabag**—that being a vocalisation of the initials of Rabenu Levi ben Gershon. He came of a family of scholars, but the identity of his father is in dispute. His prin. work is *Milhamot Adonai* (Wars of the Lord), a treatise on immorality, prophecy, omniscience, providence, the celestial spheres, and the eternity of matter. He followed Aristotle, being the first Jew that dared, in so doing, to join issue with Heb. theology. He d. at Perpignan. See I. Husik, *History of Medieval Jewish Philosophy*, 1946.

Gersoppa, Falls (also called the **Jog Falls**), lie on the Shrivati R. where it forms the boundary between Bombay and Mysore States, India. They are possibly the finest falls in India. The riv. divides in its descent into 4 cascades, and the cliff over which it falls is 830 ft high.

Gerstöcker, Friedrich (1816-72), Ger. writer and traveller, b. Hamburg. For some years he lived an errant life in America, of which he pub. an account on his return to Germany. Later he travelled extensively in both America and Africa (1850-68). His narrative descriptions of his travels, written in vivid style, have enjoyed considerable popularity. He also wrote many novels, the plots of which were founded on his experiences.

Gerstenberg, Heinrich Wilhelm von (1737-1823), Ger. poet and critic, b. Tondern, Schleswig. He entered the Dan. Army, and served in the Russian campaign of 1762, but later left the army for the civil service. In 1759 he pub. a vol. of anacreontic poems, *Tändeleien*; but his best works are *Briefe über Merkwürdigkeiten der Literatur*, 1766-70, and his tragedy, *Ugolino*, 1768, which was one of the prin. forerunners of the *Sturm und Drang* period. See A. M. Wagner, *H. W. von Gerstenberg*, 1920.

Gertrude, St (c. 1256-1302), Ger. Benedictine nun and mystical writer who lived in the convent at Helfta, near

Eisleben. Her mystical writings did much to promote devotion to the Sacred Heart of Jesus. Patron of the West Indies, her feast is on 16 Nov., having been extended to the universal Church in 1877.

Gertsen, see **HERZEN**.

Gerunda, see **GERONA**.

Gervase of Canterbury (fl. c. 1160-1199), Eng. chronicler, a monk of Christ Church, Canterbury. He wrote an eyewitness account of the burning and repairing of Canterbury Cathedral, 1174. G. championed the rights of his archbishop against those claimed by the abbot of St Augustine's, and much of his writing deals with these inter-monastic disputes. But his *Mappa Mundi* and *Gesta Regum* are more general historical works, and are valuable for the picture they give of England in Richard I's reign.

Gervase of Tilbury (d. c. 1235), Eng. historical writer, said to have been a native of Tilbury. He studied law at Bologna, and was present at the meeting of the Emperor Frederick I and Pope Alexander III at Venice. He was first employed by Henry II, for whom he wrote a jest-book, and later entered the service of William of Champagne, cardinal archbishop of Rheims. In 1198 he entered the service of the Emperor Otto IV, who made him marshal of the kingdom of Arles, and married him to an heiress. It was to amuse the emperor that he wrote his best-known book, *Otia Imperialia*, which contains a historical geography of the world as well as a good deal of legendary matter.

Gervex, Henri (1852-1929), Fr. painter, b. Paris. He first devoted himself to the painting of mythological subjects and the paintings of the nude, but afterwards took up the study of modern life and of effects of bright daylight, indoor and outdoor, with great success. His most famous picture perhaps is his 'Before the Operation,' 1877, a hospital scene, showing the surgeon Péan and his pupils.

Gervinus, Georg Gottfried (1805-71), Ger. historian, b. Darmstadt, and educ. at Sussen and Heidelberg. In 1835 he was appointed prof.-extraordinary at Heidelberg, and in 1836 prof. of hist. and literature at Göttingen, from which he was dismissed in 1837 for signing the protest against the unconstitutional conduct of Ernest Augustus. He went to Heidelberg, and in 1847 started the *Deutsche Zeitung*. In 1848 he was a member of the Frankfurt National Assembly. G. was a patriot of liberal ideals and a defender of constitutional liberty as is shown by his writings as well as by his conduct; his *Introduction to the History of the 19th Century* led to his imprisonment. See life by M. Rychner, 1928.

Geryon (Greek for howler, or roarer), a monster with 3 heads, son of Chrysaor and Callirrhoe, and king of the is. of Erythra. His herds of red cattle were guarded by the giant Eurytion and the 2-headed dog Orthrus. One of the 12 labours of Hercules (q.v.) was the capture of these cattle.

Gesenius, Heinrich Friedrich Wilhelm (1786-1842), Semitist, founder of modern Heb. philology and of Phoenician epigraphy. From 1810 onwards prof. of theology at Halle. In 1810-12 he pub. *Hebräisch-deutsches Handwörterbuch des Alten Testaments*; his *Hebräische Grammatik*, 1814 (and numerous subsequent eds.), is still a standard work; in 1815 appeared *Neues hebräisch-deutsches Handwörterbuch und Geschichte der hebräischen Sprache und Schrift*; in 1817, *Ausführliches grammatisch-kritisches Lehrgebäude der hebräischen Sprache*; in 1829-58, *Thesaurus Linguae hebraeae*, etc., 3 vols.; in 1837, *Scripturae linguaeque Phoeniciae monumenta*. He also pub. other works, including those on the Maltese and Samaritan languages.

Gesner, Conrad von (1516-65), Swiss writer and naturalist, b. Zürich. Hallam described him as 'probably the most comprehensive scholar of his age.' He studied at Strasburg, Bourges, and Paris, and was appointed prof. of Greek at Lausanne in 1537. In 1541 he became prof. of natural hist. at Zürich. G.'s favourite study was botany, and he pub. in 1542 a *Catalogue of Plants* in 4 languages: Lat., Greek, German, and Fr. He founded a small botanical garden at Zürich. Another important work of his is *Bibliotheca universalis*. This is a catalogue of all the writers who had ever lived, with their works, and is written in Hebrew, Lat., and Greek. In 1551-8 appeared his great zoological work *Historia animalium*. Besides these he wrote *Mithridates de differentiis linguis*, an account of about 130 languages, and the Lord's Prayer in 22 tongues. See H. Buess, *Schweizer Ärzte als Forscher Entdecker und Erfinder*, 1945; also studies by P. A. Cap, 1864; J. Hanhart, 1924; and W. Ley, 1929.

Gesner, Johann Matthias (1691-1761), Ger. classical scholar, b. Roth near Nuremberg, and studied at Jena. In 1715 he became prof. and librarian at Weimar; in 1728 he was made headmaster of the gymnasium at Ansbach (Anspach). In 1730 he was appointed head of the Thomas Schools at Leipzig, and in 1734 became prof. and librarian at Göttingen. His works include eds. of the *Scriptores rei rusticae*, of Claudian, Horace, Quintilian, and Pliny the Younger.

Gesneria, a genus of South Amer. perennials, family Gesneriaceae, about 50 species; chiefly grown as greenhouse flowers in Britain and America.

Gesner, Salomon (1730-88), Swiss painter and poet, b. Zürich. He first became famous by his *Lied eines Schweizers* in 1751. Other writings of his are *Daphnis*, 1754, *Idyllen*, 1756, *Inkel und Der Tod Abels*, 1758, and *Evander und Alcimna*, 1768, an idyllic prose pastoral, which was trans. into many languages, including Welsh. His works are sentimental, delicate, and feeble, but they achieved universal popularity at the time of their pub., owing to the appreciation of Goethe, Lessing, and Herder. His paintings are mostly in water-colours,

but he also executed some very fine engravings. His *Letters on Landscape Painting* were pub. in 1772. He illustrated a large ed. of his poems *Idyllen*, 5 vols., 1772. See P. Leemann-van-Eick, *Salomon Gesner*, 1929.

Gesta Romanorum ('Deeds of the Romans'), name given to a collection of short, didactic Lat. stories for the use of preachers, the compilation of which was begun probably at the end of the 13th cent., or at the beginning of the 14th, by an Eng. Franciscan. Its title is only partly appropriate, for it was gradually expanded and at the present time it contains fragments of oriental and European origin as well as those from Lat. and Gk. hist. The style of the book is bad, but it is interesting from a literary point of view, for it contains the sources of the writings of Gower, Chaucer, Shakespeare, and others, e.g. Chaucer's *Man of Lawes Tale* and the main outlines of Shakespeare's *King Lear* and *Pericles*, and the incidents of the caskets and the pound of flesh in *The Merchant of Venice*, and Longfellow's *King Robert of Sicily*. The first printed ed. of the modern form of G. R. was issued at Utrecht about 1473, and an ed. in Eng. was printed by Wynkyn de Worde, 1510-15. There is a good modern trans. by C. Swan in Bohn's Library and a selection trans. into German by H. Hesse.

Gestapo, abbreviation for *Geheime Staatspolizei*, the Ger. secret police. It was deliberately organised as an integral part of the Nazi machinery of coercion soon after the rise of Hitler to power in 1933. Its ramifications extended throughout Germany into every kind of anti-Nazi organisation and by methods of terrorism it soon stamped out all resistance to Hitler. Its agents, who probably eventually numbered 150,000, supervised the conduct and even the utterances of the whole pop. and exercised the power of arbitrary arrest wherever opposition was found. The head of the G. was Heinrich Himmler (q.v.), supreme commander of the *Schutz Staffeln* (S.S.) (q.v.). The G. was pronounced at the Nuremberg trial of war criminals (1946) to be a criminal organisation.

Gestation, the retention of the young in the uterus from the time of the fertilisation of the ovum—that is, conception—to the moment of delivery. The period of G. varies with the number of the offspring and the degree of their development at birth, with the size of the mammal, and, above all, with its status in the scale of evolution. The longer duration of the condition of pregnancy is an important factor in the growth and evolution of the higher species. For women the period varies considerably above and below the average of 280 days. As regards animals which have litters the normal length of G. for a rat is 28 days, for a rabbit 35, and for a bitch 62 days. The G. of a sheep, cow, and mare usually lasts 5, 9, and 11 months respectively. For a giraffe the period may be 430 days, and for an elephant more than 600 days.

Gesualdo, Carlo, Prince of Venosa (c. 1560-1613), It. musician, b. Naples, was renowned as a brilliant amateur performer on the bass-lute. He married his first cousin Maria d'Avalos, who though only 21, had already been married twice and had children. Carlo and she had 1 son. She became paramour of Fabrizio Caraffa, 3rd duke of Andria; Carlo had them killed on the night of 16 Oct. 1590. He succeeded his father as prince (1591). In 1594 he married Elanora d'Este, at the court of whose family, at Ferrara, he afterwards resided, occupying himself with composition; but he d. at his Neapolitan estate. His madrigals, which are daringly chromatic, show him to have been a law unto himself, in composition as in life. See C. Gray and P. Heseltine, *Carlo Gesualdo*, 1926.

Getae, Thracian people, mentioned by Herodotus and Thucydides as dwelling S. of the Ister (Danube). In the time of Alexander the Great their ter. lay beyond that riv., and in the early part of the 1st cent. BC they became politically united with the Dacians (see DACIA).

Gethsemane (Aramaic, from *gath*, wine press; *shemen*, oil), a small area about $\frac{1}{2}$ of a m. from Jerusalem, at the foot of the Mt of Olives, E. of the Kidron. It contained and still contains a garden, the favourite resort of Christ and His disciples, and the scene of His agony on the night before the Passion. The present garden, cared for by the Franciscans, contains olive trees of great age, some of which are descended from, if they may not actually be, those which sheltered Christ. The rock of the agony is now enclosed in a beautiful basilica of the nations, built by subscriptions from all the national churches. The rock, surrounded by a fine low bronze rail representing thorns and pelicans, lies in front of the High Altar, over which is a large picture of Christ in His agony of prayer.

Gette, riv. in Belgium, which flows through the provs. of Brabant and Limbourg. It joins the R. Demer above Diest. Its banks were the scene of a fierce battle in May 1940 to delay the Ger. advance.

Gettysburg, U.S.A., bor. and co. seat of Adams co., Pennsylvania, situated on the W. Maryland and the Philadelphia and Reading railroads, 35 m. SW. of Harrisburg. It is an agric. region, built on and surrounded by picturesque hills, and contains sev. mineral springs of medicinal value. It is the seat of a Lutheran theological seminary and of G. College, founded in 1826 and 1832 respectively. G. was founded in 1770 and incorporated as a bor. in 1806. The battle named after it, one of the most important of the Civil war, was fought here in 1863 when the S. general, Robert E. Lee, was defeated by the northerners under Meade, and a battle monument, surmounted by a statue of Liberty, now rises from the brow of the hill in G. National Military Park. G. is the site of President Dwight Eisenhower's farm. Abraham Lincoln's celebrated

dedicatory address was made here on 19 Nov. 1863. Pop. 7000.

Geulinx, or Geulingx, Arnold (1624-1669), Dutch philosopher, b. Antwerp, and one of the disciples of Descartes. Studied philosophy and medicine at Louvain and graduated as doctor. He lectured at Louvain Univ. 1646-58. In 1665 he was appointed prof. of philosophy at Leyden. G. is a leading exponent of the speculative doctrine known as 'Occasionalism,' and the salient point of his teaching is an endeavour to explain the relations existing between body and soul. In his lifetime there were pub. only the theses which he defended on graduating at Louvain: *Saturnalia, seu quaestiones . . . disputatae*, 2nd ed., 1665. His chief works in the hist. of philosophy are *Metaphysica vera*, 1691, and also *Ethica, post tristia auctoris fata*, 1696; first part 1665. Besides these he wrote *Physica vera: Logica restituta et Annotata in Principia, Philosophiae R. Cartesii*. See J. P. N. Land, *A. Geulinx und seine Philosophie*, 1895; E. Grimm, *Arnold Geulinx Erkenntnistheorie und Occasionalismus*.

Geum, genus of herbaceous perennial plants, family Rosaceae, including about 40 species, of which the water avens (*G. rivale*), with orange flowers, and the wood avens (*G. urbanum*), are found in Britain. The water avens and other species are grown in gardens as border and rockery plants.

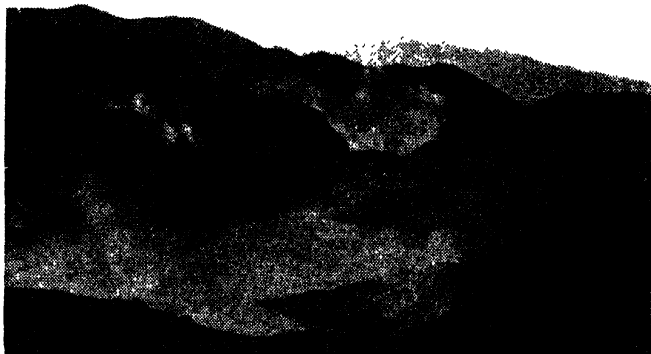
Gex, Fr. tn, cap. of an arron., in the dept of Ain, on the Jouran. It is a tourist resort, and the spa of Divonne-les-Bains is near by. The surrounding region, the pays de G., was part of Burgundy, and in the 16th cent. alternated between Savoy, Berne, and Geneva. It became Fr. in 1601, but in 1815 6 cantons were given to Geneva. Pop. 2000.

Geysers (Icelandic *geysa*, to burst out violently), mts of hot water and steam of an eruptive nature met with in some volcanic regions, more especially in Iceland and New Zealand. A geyser consists of 2 parts, a basin and a tubo. Deposits of silica, formed as the water evaporates, and sometimes becoming like a crater, form the basin of the geyser, whilst the tube leads beneath the surface. Water accumulating in fissures connected with the tube is heated until the pressure of steam overcomes the pressure of the water, and a column of hot water is projected into the air through the tube. The G. in Iceland are the best known in the world. They are situated within sight of Mt Hekla, and are the hottest springs in Europe. The G. of New Zealand are celebrated principally on account of the beautiful terraces associated with them. The basins connected with these G. are much used by bathers and resorted to by invalids. The Yellow-stone region in North America also abounds in G. The 3 localities mentioned are where G. attain their highest development; but they also exist in many volcanic regions, such as Japan, South America, and the Malay Archipelago. (See illustration, next page.)

Gezelle, Guido Pierre Théodore Joseph (1830-99), Flem. priest and poet, b. Bruges, the son of a gardener. He was trained for the priesthood, and after ordination held teaching posts at Roulers and at Bruges, until jealousy on the part of his superiors forced him to accept a curacy at Courtrai. There he spent 25 years, and did not return to Bruges till the last year of his life. He is one of the most individual figures in the revival of Flem. poetry, and the greatest of Flem. lyric poets, his work being marked by a blend of religious and patriotic fervour and a rare sensitivity of perception. He was elected a member of the Flem. academy. Besides various translations from Eng. and Fr. he pub. *Kerkhofblommen*, 1858,

and on the N. by the Fr. Sudan. The area of G. is 91,843 sq. m., and is composed of 4 divs.: the Northern Ter., 30,486 sq. m.; Ashanti, 24,379 sq. m.; Southern G. (formerly the 'Gold Coast Colony'), 23,937 sq. m.; and Togoland (formerly a U.N. Trusteeship Ter.), 13,041 sq. m. The prin. tns are Accra (cap.), pop. 135,000; Kumasi (cap. of Ashanti), pop. 78,000; and Sekondi-Takoradi (the main port of G.), pop. 44,000. Fifty different languages are spoken.

Economy.—The economy of the country is virtually dependent on the cocoa crop, which is grown entirely by peasant farmers. G. is the world's largest single producer of cocoa and has been supplying one-third of the world's requirements.



High Commissioner for New Zealand

FRYING-PAN HOT GEYSER, ROTORUA, NORTH ISLAND, NEW ZEALAND

Dichtoefeningen, 1858, *Gedichten*, 1863, *Volledige Gedichten*, 4 vols., 1878-1880, *Liederen*, 1880, *Tijdskrans*, 1893, and *Rijmsnoer om en om het jaar*, 1897. His collected works were pub. in 13 vols., 1903-5. See Caesar Gezelle, *G. Gezelle, zijn leven en werken*, 1918; B. Verhoeven, *G. Gezelle*, 1930; W. Williams, *G. Gezelle*, 1944.

Gezer, city in Palestine, referred to in the Bible as the city of Dan. It is situated in the low hills W. of the Jerusalem Mts. In ant. geography it was a Canaanite city within the ter. of Ephraim. Its site is the modern Tel Jezar. About 1500 BC it is noticed as a trib. to Egypt. In 1902 the Palestine Exploration Fund began excavations and made some interesting discoveries. See R. Macalister, *The Excavations of Gezer*, 1912.

Ghadames, see GADAMES.

Ghana, Brit. dominion in West Africa, formerly the Gold Coast colony and protectorate. G. extends for 334 m. along the Gulf of Guinea and is bounded on the E. by Fr. Togoland Trusteeship Ter., on the W. by the Fr. Ivory Coast,

Exports of cocoa represent over 90 per cent of the country's agric. exports and almost 70 per cent of the total value of domestic exports. The cocoa crop has been threatened by 'swollen shoot' disease and only drastic measures prevented it from spreading, in which case G. might well have faced financial disaster. The fluctuating world prices are often a disturbing factor. A Cocoa Marketing Board, through which the cocoa is sold, has accumulated a large sum of money by means of a compulsory levy. The fund is intended to assist growers should world prices drop below a certain level. In 1954 the value of cocoa exported was £84,598,864 (214,148 tons).

Gold is produced and 787,894 oz., valued at £10 million, was exported in 1954. Other important exports were diamonds, £4,272,684; manganese, £5,137,713; and timber, £6,680,296. Other exports are palm kernels, palm oil, copra, and kola nuts. Total exports were valued at £114 million (1954) and imports at £71 million.

An ambitious development plan was

approved by the Legislative Council in 1951 and commenced in that year. The expenditure was estimated at £82 million, of which 18 per cent is to be spent on economic and productive services; 31 per cent on communications; 32 per cent on social services; and 19 per cent on common services. In the first 4 years £47 million was spent. Grants of £4 million from the Colonial Development and Welfare Funds and from the Foreign

of G. would be very much stronger than at present. (Already a harbour is being built at Tema, 17 m. E. of Accra.) As originally envisaged, the Volta R. scheme was to be a joint venture by the G. Gov. and the Brit. Gov., associated with Canadian and Brit. aluminium companies, at an overall cost of £230 million. The International Bank is now interested, and at the G. independence celebrations both U.S. and Canadian financial interests



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THE NEW BANK OF GHANA

Dr Kwame Nkrumah and others are inspecting the building during construction

Operations Administration have been received. A scheme to harness the waters of the Volta R. and use the power to exploit great bauxite reserves has reached the blue-print stage. The production of aluminium in vast quantities within the sterling area at comparatively low cost is an extremely attractive idea and technically there appear to be no serious obstacles. The feasibility of the scheme was examined on behalf of the Brit. and G. Govs. in 1949, and as a consequence a Preparatory Commission was set up in 1953 to complete the investigations and to report. If the scheme were to materialise, the economy

made it clear that they were favourably disposed in principle towards assisting with the development of G. The Prime Minister has taken every opportunity to emphasise that foreign capital will be welcomed provided there are no political strings tied to investment and that repatriation of capital and profits will be guaranteed. It may, however, take a long while for G. to create the political and economic climate necessary to instil confidence in the minds of foreign investors. That confidence does not at present exist, so that the implementation of the Volta R. project in the near future seems somewhat problematical.

Revenue and Expenditure.—The revenue of G., 1954-5, was £30,567,534, and expenditure £79,860,268, compared with £3,780,288 and £3,489,346 in 1938. The main source of revenue is from customs and excise, £22,388,361 in 1954-5.

Climate.—The climate varies considerably according to the altitude and seasons. Sea breezes make the coastal regions habitable for Europeans. Other areas are less pleasant and the humidity is usually over 90 except between Dec. and Mar. in the N., when it drops to perhaps 30. The harmattan (dry N.E. winds from the Sahara) extend through Jan. and

Feb. and often carry so much sand that in the N. region visibility becomes poor and air navigation difficult. Aug. is the wettest month in the N., and Oct. further S. There is a short rainy season in May and June.

Communications.—Accra has an international airport linking G. with other parts of West Africa, Europe, and America. There are airfields at Kumasi, Tamale, and Takoradi, used mainly for internal services. There are 670 m. of railway track, the main lines being from Accra to Kumasi (357 m.). The gauge is 3 ft 6 in. During the year 1954-5 4,805,051 passengers were carried, and 1,612,679 tons of freight. There are 4177 m. of road maintained by the gov. Other roads are maintained by local authorities and regional organisations. The chief port is Takoradi, and 6,537,749 tons were handled there during 1954. A modern harbour is being built at Tema in connection with the Volta R. project (q.v.).

Education.—There is an insatiable demand for education in G., where the literacy rate is extremely low. There were in 1954 3706 primary and middle schools with 459,834 pupils (324,155 boys) and 44 secondary schools with an enrolment of 8185 (6893 boys). Trade and technical institutions have an enrolment of 1256 (1120 boys). There were (1954) 2869 students in teacher-training colleges (1981 men). These figures do not include the schools in Togoland, which at the same date numbered 429 primary and middle schools with an enrolment of 47,952 (30,857 boys); there were 6 secondary schools with 417 pupils (4 girls) and 4 teacher-training colleges with 403 students (340 men). The Univ. College of G. prepares for London Univ. degrees in arts, theology, science, economics, law, and agriculture. There is a dept. of extra-mural studies. There are 349 undergraduates in residence. Achimota College, opened in 1925, was built at a cost of £500,000 by the gov.; on its site, in 1948, was founded the Univ. College of G., which remained there until the completion of the permanent site at Legon. The College of Technology, Arts, and Science at Kumasi has an enrolment of 676 students in residence. In 1954 there were in the U.K. and Ireland 854 students and trainees from G. A further 121 were in the U.S.A. In 1954-5 expenditure on education was £7,222,750 compared with £290,553 in 1937.

Religion.—The great majority of the inhab. are fetish worshippers. Superstition and the power of ju-ju show little sign of disappearance. Human sacrifice and ritual murder, though seldom brought to light, still exist. In 1945 a number of men were sentenced to death for the murder of Akyea Mensah, the Odikro of Apediva, who was sacrificed to the spirit of the late paramount chief, Nana Sir Ofori Atta. In the Northern Ter. Islam has made steady, but Christianity, on the other hand, very slow, progress, and while the official figures are (1955) Rom. Catholics 527,000, Presbyterian Church of G. 180,000, Methodists



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GOLD MINERS AT WORK IN THE TARKWA GOLD MINE, GHANA

Feb. and often carry so much sand that in the N. region visibility becomes poor and air navigation difficult. Aug. is the wettest month in the N., and Oct. further S. There is a short rainy season in May and June.

Health.—Malaria is still common as well as most other tropical diseases. Medical science has done a great deal to check the effects of disease, but much has yet to be done before G. can claim to be a healthy country. In 1954-5 £4,133,392 was spent on medical and health services, which sum included £2,096,702 for development projects. The total should be compared with that spent in 1935-6, i.e. £281,395. It will then be realised that inadequate as may be the amount spent (in view of the necessity for increased research and active field work), nevertheless there is a movement in the right direction. There are 4 central (gov.) hospitals with specialist facilities, in addition to 27 gov., 10 mines, 10 mis-

149,000, it can be doubted whether fetish worship has been entirely abandoned by a high proportion of those who are nominally of the Christian faith. The Christian missions have played an important role in the development of education in G.

History.—In 1471 Portuguese navigators reached G. in search of gold, spices, and ivory, and in 1482 built their first fort at Elmina. They built sev. other forts which served as trading ports. After 160 years the Portuguese withdrew, and until 1872 the hist. of G. is largely an

extension of the struggle between the Netherlands and Britain. The expansion of the slave trade attracted Swedes, Germans, and Danes, who built sev. castles, including Christiansborg which is to become the official residence of the prime minister of G. Hitherto it has been the residence of the Governor. As early as 1618 James I granted a charter to a London company for 'adventuring in the golden trade of Africa.' The bulk of the trade, in both gold and slaves, was carried on by chartered companies. The fortunes of war between the Dutch and Brit. were evenly divided, and after the peace of Breda a new company under the patronage of Charles II built 7 more castles along the coast. In 1673 these events were celebrated by the coining of 50,000 gold pieces bearing the company's stamp—an elephant. These were called 'guineas' because they were struck in the gold brought by the company from Guinea. England's association with G. in those days was based entirely on the slave trade. Little was known of the hinterland except that it was a source of prisoner-of-war slaves who were brought down to the European forts along the coast by their Ashanti captors. It has been estimated that an average of 10,000 slaves a year were exported from G. After the abolition of slavery the Brit. and Ashanti had nothing in common; on the contrary they became enemies, and between 1800 and 1800 there were 7 Ashanti wars. These wars arose mainly because the Brit. endeavoured to protect the coastal people against the Ashanti. In 1874 Sir Garnet Wolseley marched on Kumasi, which was defended by 40,000 Ashantis who suffered losses estimated at 20,000. The Brit. entered Kumasi and destroyed it, and the treaty of Fomenna was signed, under which the Colony of the Gold Coast was set up in July 1874 and the tribes freed from Ashanti domination. In 1886 another expedition under Sir Francis Scott marched on Kumasi to enforce terms of the treaty of Fomenna, which included undertakings to cease the practice of human sacrifice and to pay indemnities. Neither of the conditions was fulfilled. In 1897 the Northern Ter. came under Brit. rule following treaties concluded with various chiefs. In 1896 Prempeh, the chief, and 7 other lesser chiefs, together with the queen mother, were exiled to the Seychelles. He was allowed to return in 1924. The Ashanti Confederacy was restored in 1935, and Prempeh's successor was proclaimed Asantehene, the Ashanti designation for the head of the nation. Following Sir F. Scott's capture of Kumasi, a fort to hold 300 was built. The symbol of the spiritual body of the Ashanti people is the Golden Stool (q.v.). It was thought that if this could be obtained the Ashanti would thereafter become more tractable. In 1900, therefore, the governor, Sir F. Hodgson, visited Kumasi and demanded the Golden Stool, whereupon the garrison was besieged in the fort and eventually had to fight its way to the coast. The chiefs were deposed but the Golden Stool was not surrendered. It was brought out from its hiding place many years later. In 1901 the protected areas were annexed as a Brit. possession, and the boundaries between these areas and Gold Coast Colony demarcated by Order in Council 5 years later. In 1922 a portion of Togoland (q.v.), formerly a Ger. possession, was placed under Brit. and Fr. mandate by the League of Nations and the Brit. portion was administered as an integral part of the Gold Coast. Togoland became a trusteeship ter. after the formation of U.N.O. There were serious disturbances in Mar. 1948, attributed to disaffection stimulated by men who had served in the army overseas and who found it difficult to readjust themselves, financially and otherwise, to prevailing economic conditions. To this must be added, as an aggravating factor, the increased cost of living. Riots followed



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INDUSTRIAL WORKER MAKING CLOTH ON A MODERN LOOM

extension of the struggle between the Netherlands and Britain. The expansion of the slave trade attracted Swedes, Germans, and Danes, who built sev. castles, including Christiansborg which is to become the official residence of the prime minister of G. Hitherto it has been the residence of the Governor. As early as 1618 James I granted a charter to a London company for 'adventuring in the golden trade of Africa.' The bulk of the trade, in both gold and slaves, was carried on by chartered companies. The fortunes of war between the Dutch and Brit. were evenly divided, and after the peace of Breda a new company under the patronage of Charles II built 7 more castles along the coast. In 1673 these events were celebrated by the coining of 50,000 gold pieces bearing the company's stamp—an elephant. These were called 'guineas' because they were struck in the gold brought by the company from

and the general circumstances were exploited by political parties of various hues and the trouble became widespread. So far as is known officially, 15 people were killed and 115 injured. In due course the Governor reported, and this report should be examined by students of politics if for no other reason than that there followed a chain of reaction in other parts of the African continent, especially perhaps in the Sudan. Immediate and subsequent events were regarded in some quarters outside the Sudan as indicative of weakness at Westminster. The Governor's report asserted that there was a link between organised Communism and the extremists of the 'United Gold Coast Convention' which first became known in 1947—a most opportune moment. Closer investigation showed that the convention, although it had the attainment of self-gov. as its aim, was in fact revolutionary. It is interesting and significant (if read in connection with the hist. of other parts of Africa now within the Brit. Commonwealth) to note that African lawyers trained in the U.K. seem to predominate as anti-Brit. leaders. The Governor's report, pub. on 4 Aug. 1948, attributed the disturbance to political frustration among educ. Africans who saw no prospect of attaining effective political power under existing conditions, which appeared to favour the estab. chiefs: to increasing literacy, and general stimulation of political consciousness. There were, of course, sev. other factors, but the overall attitude of the local pop. was one of attack against the suzerain power, i.e. the U.K. The Brit. Gov., at the time of the Governor's report, issued a statement and commented that 'a European system cannot be imposed arbitrarily on an African society; readiness to give must be matched by willingness to receive.' The 1948 riots had their political repercussions. The United Gold Coast Convention, led by Dr J. B. Danquah, came under particular scrutiny, as stated above. A commission was appointed, and as a consequence recommendations were made by an all-African committee under Mr Justice (Sir Henley) Coussey and a constitution drafted. In the interim, the Convention People's party under Mr Kwame Nkrumah won control following a general election in 1951. Mr Nkrumah was in gaol at that time for his part in a passive resistance movement which had ended in violence. This is worthy of note because non-violence as a political weapon is not one which can easily be adapted to the African temperament. However, the Convention People's party having won the election, the governor, Sir Charles Arden-Clarke, summoned Mr Nkrumah to form a gov. and Mr Nkrumah was accordingly released from prison and became the 'Leader of Government Business.' In 1952 this title was converted to that of 'Prime Minister.' On 18 June 1954 the Gold Coast (Constitution) Order in Council, 1954, came into operation, which provided

for a Cabinet of ministers consisting of not less than 8 members of the Legislative Assembly appointed by the Governor 'acting in accordance with the constitutional convention applicable to the exercise of such functions in the United Kingdom by Her Majesty.' The Council of Ministers dropped the remaining Europeans and the Gold Coast obtained full internal self-gov. In 1954 and in 1956 there were general elections, both of which were won by the Convention People's party. Meanwhile a strong opposition had grown up, especially among the Ashanti. The National Liberation Movement, with Prof. K. S. Busia as leader, and the National People's party made strong joint representations to Mr Lennox-Boyd, Colonial Secretary, demanding 'separate independence for Ashanti and the Northern Territories, and a partition commission to divide the assets and liabilities of the Gold Coast among its four component parts' (20 Nov. 1956). On 27 Nov. the National Liberation Movement issued a 10-point plan, which was forwarded to the Colonial Secretary, calling for the estab. of Ashanti (or a Union of Ashanti and the Northern Ters.) as an independent state within the Commonwealth. The Ashantehene, Otumfuo Sir Agyeman Prempeh, supported both opposition parties; Prof. Busia visited London, and on 10 Dec. 1956, through the medium of the press, protested about the lack of checks, balances, and safeguards 'essential to the preservation of individual liberty and the rights of minorities and regions in a nascent state.' A Colonial Office statement on 10 Dec. issued in Accra said that 'H.M. Government does not consider that partition of the Gold Coast is in the interests of the Gold Coast as a whole or of any of its component parts, and cannot abandon its established policy.' Late in Jan. 1957 the Colonial Secretary spent a week in the Gold Coast and met political leaders of all parties. It seemed probable at one stage that there would be a repetition of the riots which had occurred in Kumasi during Jan. and May 1955. There was talk of revolution and general threats of resort to violence. On 18 Sept. 1956 the Colonial Secretary announced that the Gold Coast would achieve independence on 6 Mar. 1957. This date was chosen because of local historic significance since it was the anniversary of the signing in 1844 of the document by virtue of which jurisdiction over the Gold Coast accrued to Britain. On 8 Feb. 1957 a White Paper (Cmd. 71) was pub. and on the same day the G. Independence Bill was enacted. The leaders of all the political parties expressed qualified satisfaction and on 12 Feb. conciliatory statements were made in the G. Legislative Assembly.

At the eleventh hr strong armoured detachments of the G. Regiment were despatched to Togoland to maintain law and order, but only after some spilling of blood. At midnight 5-6 Mar. the state of G. became a full member of the Brit.

Commonwealth of Nations; the first National Assembly of G. took the place of the Legislative Assembly; and on 7 Mar. the Security Council unanimously approved G.'s membership of the U.N., the 81st member state. The Queen was represented at the independence ceremonies by her aunt, the Duchess of Kent.

The name G. was derived from that of an ant African kingdom which fl. in the W. Sudan from about ad 300-1240. It has been claimed that the ancestors of the Akan tribe originally came from this kingdom, but we have no definite proof. The flag of G. is a tri-colour of red, gold, and green horizontal stripes with a black star on the gold stripe. Sir Charles Arden-Clarke, the last governor of the Gold Coast, became the first governor-general of G. He retired in May 1957, and Lord Listowel was appointed in his stead. The opposition parties to the Nkrumah gov. were re-formed in Oct. 1957.

Pop. of G., 4,620,000 African and 13,000 non-African (Northern Ter., 1,000,000 plus; Ashanti, under 1,000,000; Togoland, 400,000; Southern G., 2,500,000).

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Gharapuri, see ELEPHANTA ISLAND.

Gharbiya, maritime prov. of Lower Egypt. Area 2818 sq. m.; pop. 2,327,031.

Ghats (Sanskrit gates, passes, or cauc-way), 2 converging ranges of mts, known as the E. and W. G., running parallel with the E. and W. coasts of S. India. The W. range starts from the Tapti valley and forms an almost unbroken and precipitous barrier of rock, the prin. passes being the Thalghat and the Bhorghat. On the landward side there is a gradual slope to the table-land of the Deccan, and the W. G. appear as low hills, forming the W. edge of the plateau. The E. G. begin in the neighbourhood of Balasore and run through Andhra and Madras states. They are of a more broken character, with an average height of 1500 ft. The word *ghat* is also regularly used in India for a landing-stage on rivs., also for riverside cremation sites.

Ghazal, monorhythmic verse form, or ode, used by Persian, Arab, Turkish, and Urdu poets. The 2 hemistichs of the first line rhyme, the remaining rhymes being at the end of each line. The G. is usually erotic or mystical, and not more than some 12 lines. The poet's *nom de guerre* is customarily introduced in the last line.

Ghazali, Mohammad Al- (1059-1111), Muslim theologian and philosopher, known in the W. as Algazel. He was b. at Tus in Khorasan, studied there, at Nishapur, and other places, and was

appointed teacher of theology and law in the Nizamiya college in Bagdad, but stayed there only 4 years, for he lost his faith and became ill in body. He described the crisis and his recovery in *The Deliverer from Error*. He led a wandering life for 10 years in Syria and Egypt before returning to Bagdad. During this time he recovered his faith and wrote his greatest work, *The Revivification of Religious Knowledge*. He taught for a time in Bagdad and Nishapur and then retired to Tus where he lived quietly, teaching and practising religion. His work in philosophy was to show that it could not prove what it claimed to prove, and in religion he made it possible to combine the fervent piety of the mystic with the legalism of the orthodox. See Carra de Vaux, *Ghazali*, 1902; Margaret Smith, *Al-Ghazali*, 1944.

Ghazipur, tn of Uttar Pradesh State, India, on the Ganges, 45 m. E. of Benares. A mausoleum commemorates the death here of the governor-general, Lord Cornwallis, in 1805. G. was formerly the site of one of the opium agencies estab. by the gov. of India.

Ghaznevids, or **Ghaznevides**, famous Muslim dynasty of 21 rulers, founded by the freedman, Alpteghin (Alp-Tigin) of Bokhara, at Ghazni, Afghanistan, about ad 962. He withstood the Samani dynasty, and his successors Sebuktighin (Sabuk-Tigin) (977-97) and Mahmud (999-1030) (the most celebrated of the line) extended their sway over Kabul, Peshawar, and Lahore to N. and E., to Bagdad and the Caspian on W. and NW. The poet, Firdausi, and the philosopher, Avicenna, fl. at Mahmud's court. Later rulers were Masud I (1030-41), Maudud (1042-8), Farrukh-zad (1053-9), Ibrahim (1059-99), Balram (1117-50), Khusru Malik (1160-86, last of the dynasty). The cap. was moved by the last 3 kings from Ghazni to Lahore in India. The power of the G. was shattered by the rulers of Ghur (about 1152), and finally overthrown by Shihab ud-Din Mohammad, Prince of Ghur (1186). Ghazni was destroyed by the Mongols under Genghis Khan in 1224. It was the site of Brit. struggles for possession in Afghanistan in 1839 and 1842.

Ghazni, **Ghuznee**, **Ghizni**, or **Gazna**, tn and fort of SE. Afghanistan, on R. G., 80 m. SW. of Kabul. Near by are ruins of the ant city, important in the Middle Ages and one of the finest cities in Asia under Mahmud (11th cent.). G. is surrounded by a mud wall, and is commercially important as being on the caravan route from Persia to India. It stands about 8000 ft above sea level. The Brit. stormed the tn in 1839, and recaptured it from the Afghans in 1842. There are 2 famous towers, and the site of Mahmud's tomb. The celebrated 'gates of Somnath,' kept here from about ad 1000, were removed to Agra by the Brit. in 1842. Moslem pilgrims frequently visit its numerous shrines. Trade in fruit, skins, and wool is carried on. Pop. about 10,000.

Gheel, *see* GEEL.

Ghent (Flem. *Gent*, Fr. *Gand*), cap. of the prov. of E. Flanders and one of the most important cities in Belgium. It is situated at the junction of the Rs. Lys and Scheldt, 34 m. NW. of Brussels. The city is divided by its many streams and canals into 26 is., connected by 64 bridges. The building of new roads and streets has destroyed much of the medieval character of the city, but many of the old buildings are still preserved in their original states. The city has an area of 14 sq. m. and a pop. of (1955)

hall (1518-1620), and the numerous old guild houses, one of which dates back to the 13th cent. There is still to be seen an arch of the old Prinsenhof, where Charles V was b. in 1500. G. has about 20 monasteries and 3 *béguinages* or convents, the oldest being of the 13th cent. The squares of G. have played a great part in hist., especially the *Marché du Vendredi*. There are also sev. museums. G. is a great industrial centre, and leads all Belgium in textile production, which employs about half the city's available man-power. The cotton mills of G.



GHEENT: THE QUAI AUX HERBES

E.N.A.

163,000. The best view of the city is to be had from the 315-ft belfry (1183-1339) in the city centre. Most famous of the many churches is the cathedral of St Bavon (12th- and 16th-cent.), one of the best examples of pure Gothic in Belgium, and with magnificent marble interior decoration. The cathedral is rich in art treasures, amongst them the famous 'Adoration of the Lamb' by the brothers van Eyck. Other famous churches are the 13th-cent. church of St Nicolas, the church of St Jacques, with 12th-cent. Romanesque façade, the 16th-cent. church of St Michael containing van Dyck's 'Crucifixion,' and a baroque church of St Peter. Nor is G. deficient in beautiful secular buildings; the castle of Gravensteijn (1180) is considered the most perfect example of a medieval fortress in Belgium. Also worth seeing are the Duivelsteen (1245), the Cloth Hall (1325), the tn

house twice as many spindles as all the rest of the country. Machinery and chemicals are also manufactured in considerable quantities. In and around the city are hundreds of nursery gardens, producing large quantities of azaleas and begonias for export. A world-famous flower show, the *Floralies*, is held in G. every 5 years. G. is the second port of Belgium and has excellent harbour and port facilities to cope with its large vol. of foreign trade. A ship canal gives direct communication between the Grand Bassin and the harbour of Terneuzen in Holland and the R. Scheldt. A new lock at Terneuzen allows passage to vessels up to 26 ft draught at any tide between that port and G. G. is the seat of a bishopric—and of the Royal Flem. Academy—it has a court of appeal, a commercial court, and sev. consular representatives.

G. has played a great role in hist.; it was

first mentioned in the 7th cent. It waged violent wars against Flanders and Burgundy and Charles the Bold, rebelled against Charles V and Philip II, and was sev. times captured by the Fr. It was incorporated in the kingdom of the United Netherlands under the peace of Paris in 1814, and passed to Belgium on the estab. of that kingdom in 1830. During the First World War G. was occupied by the Germans from Oct. 1914 till the armistice. In May 1940 the retreating Allies blew up many of the bridges, and there was also some bomb damage, but fortunately no historic monuments were affected. G. was then occupied by the Germans, and was liberated by Canadian troops on 6 Sept. 1944.

Gherardesca, Ugolino della, see **UGOLINO**. **Ghetto**, name of the Jewish quarter in It. cities, and later in others. Originally Jews were strictly confined to this part and quite separated from their Gentile neighbours. The G. of Rome, instituted by Pope Paul IV, 1556, was removed in 1870.

Ghibelline, see **(GUELPHS AND GIBEL-LINES)**.

Ghiberti, Lorenzo (1378-1455). It. goldsmith, painter, and sculptor. *b.* Florence. He studied design under Bartoluccio, and in 1400 executed a fine fresco at Rimini in the palazzo of Pandolfo Malatesta. G. was chosen as colleague of Brunelleschi in the erection of the Santa Maria del Fiore. His design for the bronze gates to the baptistery of St John at Florence was preferred to those of his competitors, Brunelleschi being one of them. Scenes from the O.T. were represented, and later G. did another still finer gate. Michelangelo gave them the highest praise, pronouncing them worthy to be the gates of paradise. The first gate was completed in 1424, the second in 1452. Other masterpieces are statues of St Matthew, St John the Baptist, and St Stephen for the church of Orsanmichele (1414-22); bas-reliefs for the Baptistry of Siena and sarcophagus of San Zenobio in Santa Maria del Fiore; sepulchral monuments of Dati and of the Albizzi at Florence (c. 1427). The bas-reliefs of the shrine of San Zenobio are especially fine. G. did much to restore the antique style in sculpture. In beautiful ornamentation and perfection of form and finish in all details he has never been surpassed. His earliest known work, a bronze-relief of the 'Sacrifice of Isaac,' is in the Uffizi. See L. Scott, *Ghiberti and Donatello*, 1882; G. Vasari, *Lives of the Painters and Sculptors*, 1885; Lord Balcarres, *Evolution of Italian Sculpture*, 1909; and lives by H. Gollub, 1929, and J. von Schlosser, 1941.

Ghika, Helena, Princess Koltsov Masalsky (1829-88), Rumanian writer, pen-name 'Dora d'Istria.' A daughter of Prince Michael, she married a Russian prince, 1849, but left him in 1855. After living in Belgium and Switzerland she settled in Florence in 1861. Her works include *La Vie monastique dans l'église orientale*, 1855, *La Suisse allemande*, 1856,

Les Femmes en Orient, 1859-60, *Des Femmes, par une femme*, 1864, *Gli Albanesi in Rumania: Storia dei Principi Ghika*, 1873, *La Poésie des Ottomans*, 1873.

Ghika, Jon (1817-97), Rumanian statesman, studied at Paris, becoming prof. of mathematics and political economy at Jassy, 1843-5. A leader of the revolution of 1848 in Wallachia, he was representative of the provisional gov. at Constantinople. In 1854 the sultan made him governor of Samos, where he rid the is. of pirates, and prince, 1856. In 1859 he returned to Wallachia and served as a minister under Cuza, whom he helped to depose. G. was prime minister under Prince Charles, Cuza's successor, 1866-7 and 1870-1. He was Rumanian minister in London, 1881-8. Apart from political works he wrote *Letters to Vasile Alexandri*, 1887, *Memories of Exile*, 1890, and trans. of sev. plays of Shakespeare.

Ghilliaiks, see **GILYAKS**.

Ghilzais, warlike clan of Pathan stock in E. Afghanistan, between Kabul and Kandahar. By language they are Aryan, and Hoidich (1899) believes them to be of Turkic origin. A race of sturdy farmers and shepherds, they were a severe menace to the Brit. troops during the retreat from Kabul, 1842. They profess Islam, but some of their customs tend to reveal the existence among them of a primitive Christianity.

Ghirlandajo, or Ghirlandaio, Domenico (c. 1449-94) (properly Domenico Bigordi, or Corradi), surnamed Il Ghirlandaio (garland-maker) after his father Tommaso Bigordi, a goldsmith. He was a celebrated painter and mosaicist, the head of a very active studio, and the first Florentine to attain skill in aerial perspective. He studied under Baldovinetti, and was influenced by Castagno, Masaccio, and Verrocchio (q.v.). Among his pupils were his 2 brothers Davide and Benedetto, Michelangelo, Francesco Granacci, and Bastiano Mainardi. Domenico painted numerous scenes from the lives of the Virgin and John the Baptist. He executed frescoes in Florence in the church and refectory of Ognissanti (1480), only 'The Last Supper' and 'St Jerome' being left; in the Sassetti chapel in Santa Trinità (1485); 'Life of Saint Fina' in the Capella Fina, 1475; in the choir of Santa Maria Novella ('St Francis', 1485-90); in the chapel of the Innocenti, 1488; and in the Palazzo Vecchio, 1481. His pictures include 2 'Holy Families' (Berlin); 'Adoration of the Shepherds', 1485 (Florence Academy); 'Madonna and Child with Saints'; 'St Catherine of Siena' and 'St Lawrence' in the Pinakothek at Munich; 'Adoration of the Kings', 1487; 'The Visitation', 1491 (now in Louvre); 'The Birth of the Virgin', 1490; 'The Calling of St Peter and St Andrew', 1485 (Sistine Chapel, Rome). See R. Zürcher, *Italianische Wandmalerei*, 1944; also studies by E. Steinmann (in Knackfuss's *Kunstler Monographien*), 1897; C. S. Davies, 1908; and J. Laubs, 1943.

Davide (1452-1525) and **Benedetto** (1458-97), brothers of Domenico, assisted

him in his works, but left no original ones. Davide helped Domenico in the mosaic of the 'Annunciation' over the N. portal of Florence cathedral, and executed others at Orvieto, Florence, and Siena.

Guido (1483-1561), son of Domenico, was a skilful painter and friend of Raphael. His works include 'Coronation of the Virgin', 1503 (in Louvre); 'Annunciation' (Uffizi, Florence); 'Goldsmith' (Pitti Palace), formerly attributed to da Vinci; 'Nativity' (Berlin Museum); 'San Zenobio raising a Dead Child' and 'Burial of San Zenobio' (Uffizi, Florence); 'Madonna della Misericordia'; 'Virgin adored by Saints.'

Ghiura, see GYAROS.

Ghizeh, see GIZA.

Ghizni, see GHAZNI.

Ghost (animal), see LEMUR.

Ghost Marriage, institution by which a man who dies without heirs has a wife 'married' to his name by his brother. She bears children (by the brother, with whom she lives) who are legally those of the dead man, who thus has heirs to inherit his wealth and sacrifice to his spirit. It is found in many primitive peoples, e.g. the Zulu.

Ghosts, see APPARITION; HALLUCINATION.

Ghūr, or **Ghore**, **Gaur**, **Gour** (Sanskrit, fort), mt region of W. Afghanistan, 120 m. SE. of Herat, stretching towards Kandahar. It is in part the site of the anct Paropamisus, and medieval Gharshistan. In all ages the country has been inaccessible, and the site of the old cap. Firoz Koh cannot be definitely fixed. The peak Chalap Dalan or Koh-i-Kaisar is 13,000 ft high. The present pop. are mostly Hazaras or nomad Aimaks. Since 1845 G. has been included in the ter. of Herāt. It was famous in the 12th and following cents. as the seat of a native dynasty, the Ghūri, founded by Ala-ed-Din Jahansoz, who burnt Ghazni, 1152, and harassed the Ghaznevids. His successors extended their empire and completely subdued Ghazni, 1186. Out of their victories grew up the Mogul kingdom of Delhi, and the preponderance of Islam in Hindustan dates from this time. Their power was broken by Mohammed Shah and Jelal Ed-Din of Khwarezm (Khiva), 1214-16. A short revival took place under the Kurt dynasty, 1245, but the final overthrow came with Timur's capture of Herāt, 1383. See also AFGHANISTAN. See J. Ferrier, *Caravan Journeys*, 1856.

Ghōrkhas, predominant race of Nepal in the Himalayan region. They are hardy mountaineers of Hindu descent, speaking a Sanskritic dialect. Driven out of Rajputana by Muslim invaders, they conquered Nepal after much fighting, 1767-8. The East India Company came into conflict with them, 1814, but peace was soon declared, the company obtaining possession of the S. slopes of the Himalaya, but recognising Nepal's independence. As soldiers the G. have won fame for extreme courage and determination. All of the 10 regiments of G. served during the First World War,

either in France, Flanders, Gallipoli, Mesopotamia, Persia, Baluchistan, Egypt, Palestine, or on NW. Frontier of India. Their roll of battle honours commences with Bhurtore, and includes the Second and Third Afghan wars, Burma campaign, Indian mutiny, and China 1900 campaign. Also fought under Gen. Wavell against the Italians in the battle of the W. Desert, 1940, and later in the Burma campaigns and on the W. Front.

Ghuznee, see GAZNA.

Giacometti, Alberto (1901-), Swiss sculptor and draughtsman, b. Stampa, son of the painter Giovanni Giacometti. Studied sculpture at Geneva and in Paris, where he was first influenced by cubism and then by surrealism. Not concerned with the sculptural problem of mass, he is noted for attenuated figures which materialise impressions and feelings, and to that extent bring the aims of sculptor and painter into novel combination. His 'Pointing Man', 1947 (Tate Gallery), is an example.

Giambattista, see TIEPOLO, GIOVANNI BATTISTA, and CIPRIANI.

Gianibelli, or **Giambelli**, **Federigo** (c. 1530-92), It. military engineer, inventor of the 'infernal machines' that wrought so much havoc among the troops of Parma near Antwerp, 1585. By means of an explosive ship he destroyed the bridge built by the Spaniards across the Scheldt. G. then went to England and assisted in the preparations against the Armada, designing the fireships sent among the Sp. Fleet. See J. Motley, *United Netherlands*, vol. i.

Giannone, Pietro (1676-1748), It. historian. He studied law and practised as a barrister at Naples, spending many years in composing his *magnum opus*—*Storia civile del regno di Napoli*, 1723. This attack on the Rom. Catholic Church led to his banishment. He retired to Vienna, Venice, and finally Geneva, where he wrote his diatribe *Il Trivigno* against papal authority. He was enticed into Savoy, arrested by order of the king of Sardinia, and confined at Turin till his death. His *Opere Postume*, containing 'Anecdotes ecclesiastiques,' 1738, appeared in 1760. Mancini issued his *Opere Inedite*, 1859.

Giannuzzi, Giulio Pippi dé, see GIULIO ROMANO.

Giants (Gk *gigas*, giant), name given to adult human beings of abnormal size and stature. The average height of the whole human species is 5 ft 5 in., the tallest giant exceeding this by about 3 ft 10 in. The Akkas of central Africa are about 4 ft 5 in. in height, the Scottish farmers of Galloway 5 ft 11 in. Among famous G. may be mentioned Og, king of Bashan (Deut. iii. 11); Magrath, Bishop Berkeley's giant; Patrick Cotter (1761-1804); Charles Hyrne; Winkelmaier's Austrian (d. 1887); Topinard's Finlander (9 ft 4 in.); Chang, the Chinese giant; and the Russian Machnow (9 ft 3 in.) who appeared at the London Hippodrome, 1905. Such abnormal beings are often dull of intellect, weakly, and ungainly. As a disease 'giantism' is

closely allied to 'acromegaly,' caused by a morbid process in the sphenoid bone of the skull, an excessive development of the anterior lobe of the pituitary body. If this condition occurs in early youth the whole of the limbs are affected and gigantic proportions are the result. Giantism may be racine and not the result of disease. There would seem to have been a progressive tendency towards reduction in height since the earliest men, there being evidence of giant forms in the Middle Pleistocene, called *Gigantopithecus*. In mythology the title giant was applied to men of pre-eminent strength or prowess, not necessarily of great size. Among the various Gk conceptions were Enceladus, Typhoeus, Briareus, the Titans, and the Cyclopes. The great representation of the *Gigantomachia* (a mighty battle between the G. and the gods, later than Zeus's overthrow of the Titans, but mentioned neither by Hesiod nor Homer) is sculptured upon the altar at Pergamum. See C. Weinhold, *Die Riesen des germanischen Mythos*, 1858; M. Meyer, *Die Giganten und Titanen in der antiken Sage und Kunst*, 1887; F. Weidenreich, *Apes, Giants, and Men*, 1946.

Giant's Causeway, famous promontory of closely packed basaltic columns on the coast of Antrim, Northern Ireland, W. of Bengore Head, 8 m. from Portrush. Its origin was a great outpouring of basalt in the Tertiary period, but legend ascribed it to Finn M'Coul or Fingal, who built it as a bridge between Ireland and Scotland for the giants to cross from Antrim to Staffa. The columns are mostly hexagonal or pentagonal, about 40,000 in number, perfectly articulated by means of convex and concave joints. The 3 chief portions are the Little, Middle, and Grand Causeway. The last extends 500 ft out to sea, and is 60 to 120 ft broad. Other detached groups are called Giant's Loom, Giant's Organ, Lady's Fan. E. of the Causeway is the Giant's amphitheatre, a bay with cliffs 350 ft high. Beyond is Sp. Bay, where an Armada vessel was wrecked. Chimney Point and Pleaskein Head are also near, and the ruined castles of Dunseverick and Dunlace. See also POT-HOLES.

Giaour (corruption from Arabic *kafir*, unbeliever, or Persian *gaur*, infidel), name by which the Turks designate all those who reject Mohammedanism, especially European Christians. The word is spelt in the It. fashion popularised by Byron (q.v.), and usually employed in an offensive sense.

Gib, Adam (1714-88), Scottish 'anti-burgher' leader and preacher, b. Castle-town, Perthshire. He was the only Edinburgh minister who strongly upheld the Protestant succession (1745). He led the minority in the Anti-Burgher Synod of 1747, and in later years his fame as a preacher drew enormous congregations to his church in Nicolson Street.

Gibara, well-known Cuban seaport and resort on the N. coast (G. Bay) of the prov. of Santiago de Cuba. It has a well-fortified harbour and civil and

military hospitals. Trades in fruit, corn, tobacco, coffee, sugar. Gold and silver are found near by. Pop. 8100.

Gibbaros, see JIBAROS.

Gibberd, Frederick (1908-), architect and tn-planner, b. Coventry; was trained in Birmingham; started practice in London, 1930. An early work was Pullman Court (Hats), 1934-5. In 1946 he designed some prefabricated houses, and steelworks at Frodingham, also the



C. W. Jones

THE GIANT'S ORGAN, GIANT'S CAUSEWAY

master-plan for Harlow New Tn. Since then, his work has included a tn-plan for Nuneaton; the new buildings of London Airport; a hospital for E. Belfast; and the Hull College of Technology.

Gibbet, species of gallows erected near the scene of a crime on which the convicted criminal was suspended in chains after his execution, by order of the courts of justice. The body thus hung, encased in an iron frame, was supposed to serve as a public warning to terrorise the evil-minded. This practice, legalised in 1752, was abolished in 1834. G. was the name of the highwayman in Farquhar's *Beaux' Stratagem* who boasted himself the

best-conducted man in his profession. See A. Hartshorne, *Hanging in Chains*, 1891.

Gibbings, Robert (1889-1958), artist and travel writer, *b. Cork*. During the First World War he was badly wounded at Gallipoli. Settling in London, he was proprietor for a time of the Golden Cockerel Press, and then became a lecturer in typography at Reading Univ. He wrote a number of travel books, illustrated with his own wood engravings. After *A Tahitian Journal*, 1932, *Coconut Island*, 1936, and *Blue Angels and Whales*, 1938, he scored a notable success with *Sweet Thames Run Softly*, 1940, *Coming Down the Wye*, 1942, and *Lovely is the Lee*, 1944. He went back to the South Seas for *Over the Reefs and Far Away*, 1948, and home again for *Sweet Cork of Thee*, 1951, *Coming Down the Seine*, 1953, and *Till I End My Song*, 1957.

Gibbon, Edward (1737-94), historian, *b. Putney*. He was a very delicate child. At 7 he received some training in arithmetic, Eng. and Lat. from a private tutor, and at 9 he went to school at Kingston-on-Thames. G. went to Westminster School in 1749. He passed many hrs in his grandfather's library at Putney, and here he developed an enthusiastic love for reading. At school poor health caused his progress to be very slow and finally the idea of education at school was given up and he was instructed henceforth intermittently by tutors. His love of reading, hitherto indiscriminating, now led him into a preference for hist., and when once interested in a subject of hist. he devoured all he could find upon it in every book to which he could gain access, not reading the book all through but pursuing his subject into every hole and corner. In his sixteenth year his health improved as if by miracle, his constitution became 'fortified and fixed,' and from that time onwards he was free from ailments. The same year (1752) he went to Oxford as a gentleman commoner of Magdalen College. Fourteen months of desultory reading and of gaiety, during which he read Bossuet and declared himself a Rom. Catholic, ended in his being expelled by an outraged univ. and sent by an angry father to Lausanne to the home of a Calvinist minister, M. Pavillard, 'there to be brought to a better way of thinking.' Under excellent guidance he here pursued a course of serious study, including the Lat. classics, Locke, Grotius, Montesquieu, and Pascal, together with logic and mathematics. Returning to England in 1758 he pub. in 1761 a little book in Fr., *Essai sur l'étude de la littérature* (an Eng. trans. appeared in 1764). After 2 years of 'military servitude' as captain in the Hants militia, he set out on the 'grand tour.' In Rome, amid the ruins of the Capitol, in 1764, he conceived the idea of writing the *Decline and Fall*. Hardly daring to attempt so vast a work, he contemplated his idea 'at an awful distance,' for some years working laboriously and honestly, studying original records, inscriptions, medals, etc.

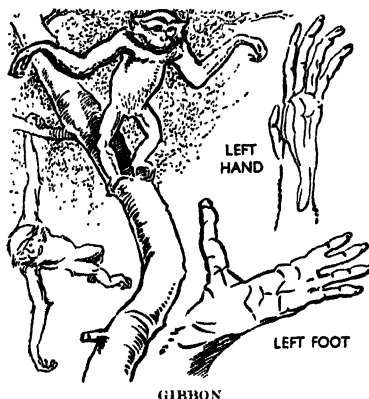
His father's death in 1770 leaving him independent, he settled in London, became M.P. for Liskeard in 1774, and accepted a gov. sinecure, which supplemented his income by about £800 a year. Losing this on a change of gov., he retired to Lausanne and settled there with his great friend Deyverdun. In 1775 the first vol. of the *Decline and Fall* was pub. The work aroused tremendous enthusiasm, and was sold out in a few days, a second, and then a third ed. becoming necessary. The next 5 years were wholly taken up with the gigantic labour of producing the succeeding vols. Vols. ii and iii appeared in 1787, and vols. iv, v, and vi in 1788. G.'s *Decline*



EDWARD GIBBON
Engraving after a picture by Sir
Joshua Reynolds

and *Fall* has borne the critical judgment of more than a century and a half without losing its place as one of the foremost historical works of all time, although modern research has shown some of G.'s assumptions and judgments to be faulty. It is unsurpassed for its comprehensiveness and its wealth of information, together with its stately diction and charm of narration. Innumerable details have been made to yield up a 'philosophy of history' in the light of which characters, events, and conditions account for each other. Defects there are, both of style and of judgment—gallicisms creep in easily, the stateliness sometimes becomes monotonous rhythm, the remarkable clearness occasionally falls. Worst of all, the calm judgment is sometimes obscured where G.'s prejudices and preferences are involved. Religion had come to have no interest for him, and the famous 15th and 16th chapters would no doubt have been more acceptable to the intellect had he not offended the

feelings by disobeying his own 'great law of impartiality' and let his love for classical Rome lead him into sarcasm in dealing with the early Christianity which he makes responsible for her downfall. His other works include *Mémoires littéraires de la Grande Bretagne* (with Deyverdun (2 vols.), 1767, 1768, *Critical Observations on the Sixth Book of the Aeneid*, 1770, *Vindication*, 1779, *Antiquities of the House of Brunswick*, edited by Lord Sheffield, 1814, and *Memoirs of my Life and Writings*, ed. by Lord Sheffield (2 vols.), 1827. See E. Clodd, *Gibbon and Christianity*, 1916; L. Strachey, *Portraits in Miniature*, 1931; also lives by J. M. Robertson, 1925; G. M. Young, 1932; R. B. Mowat, 1936; and D. M. Low, 1937. **Gibbon** (*Hyllobates*), the smallest of the anthropoid apes, rarely exceeding 3 ft in



height, is found principally in the Malay peninsula. The species include the hoolock (*H. hoolock*), a native of Assam, Harlan's G. (*H. concolor*) from Borneo, the white-banded G. (*H. lar*), a native of Malacca and Siam, and the Siamang (*H. syndactylus*). This last, found in Sumatra, is the largest of the group, black in colour with a large laryngeal pouch. The G.s are noted for their agility in climbing, their slim contour and length of arm contributing to this facility. Their loud voices and howling cries resound through the woods, particularly in early morning. They are gregarious, very intelligent, and easily tamed when young. See ANTHROPOID APES.

Gibbons, Edward Stanley (1840-1913), philatelist, b. Plymouth. He joined his father's chemist's business in 1855, and in 1856 started part-time stamp dealing, thus founding the firm of Stanley Gibbons. 1863 saw the purchase of the historic 'Cape Triangular' sack of stamps. In 1865 his first catalogue was pub.; c. 1870 he became a whole-time dealer and pub. his first stamp albums. He removed to Clapham in 1874, and to

8 Gower Street, London, W.C., in 1876. G. retired in 1890, selling his business to C. J. Phillips who formed the present limited company.

Gibbons, Grinling (1648-1721), celebrated wood-carver and sculptor, b. Rotterdam, his father being English. He settled in London, where his talent was first discovered by the diarist John Evelyn, who brought G. to the notice of Charles II and Sir Christopher Wren. G. became master carver in wood to the Crown until the time of George I, and was responsible for many of the carvings in the royal residences, at Windsor, Kensington, and Whitehall. His association with Sir Christopher Wren is a famous instance of collaboration between architect and master craftsman, his commissions including not only the choir stalls and other detail at St Paul's, but work in sev. of Wren's city churches, and busts, coats of arms, and ornament for the library at Trinity College, Cambridge. He was employed on the decoration of many mansions, e.g. Blenheim, Chatsworth, Petworth (where a ceiling is considered one of his masterpieces). As a sculptor he was also successful. The statues of Charles II at the Royal Exchange and at Chelsea Hospital, and the statue of James II (bronze) in front of the National Gallery, are by him. The base of Charles I's statue at Charing Cross was possibly executed to his design. In 1934 4 statues, representing St John, St Peter, St Paul, and the Church, in College Garden, Westminster, were identified as his work. His association with Hugh May, the clerk of works at Windsor, and with Lely and the It. decorative painter, Verrio (as well as with Wren), was important in result, and marks a new baroque tendency in Eng. decoration—as at Cassiobury Park (now destroyed) and at Windsor. The replacement of pilasters by pendants of fruit and flowers and the framing of a picture above the overmantel by elaborate naturalistic carving are typical.

G. was one of the most skilful craftsmen who ever worked in England, a master of still-life carving. This may sometimes claim too great an independence from interior architecture; and on the other hand, G. is less remarkable in figure sculpture (in which he employed collaborators, e.g. A. Dievot and L. Vandermeulen, who helped on the statue of James II, and Quellin of Antwerp) than still-life. His finest work, however, is a prodigy of skill and delicacy as in the choir-stalls of St Paul's and its great organ-case (made 1696-7). The decorations in limewood with trumpets, scrolls, and flowers above the stalls, and the boys supporting the bishop's mitre, and the heraldic 'pelican in her piety,' are a personal achievement. G. lived most of his life in Bow Street and was buried in St Paul's, Covent Garden. See H. A. Tipping, *Grinling Gibbons and the Woodwork of his Age*, 1914; A. E. Bullock, *Grinling Gibbons and his Contemporaries*, 1914; R. Gunnis, *Dictionary of British Sculptors*, 1953.

Gibbons, Orlando (1583-1625), composer, *b.* Oxford into a distinguished musical family. He was brought up at Cambridge, and took the degree of B.Mus. at Cambridge in 1606. The degree of D. Mus. was conferred on him by Oxford in 1622. G. was made organist of Westminster Abbey in 1623. He *d.* suddenly at Canterbury while waiting to take part in Charles I's marriage service, for which he had composed the music. Orlando G. marks the apotheosis of the anct Eng. musical art and with him the old church school of England may be said to cease. His compositions are still in frequent use in the church services to-day. The most famous are *Morning and Evening Service in F*; anthems: *Hosanna, O Clap your Hands, and God is gone up*; madrigals: *The Silver Swan* and *Dainty Sweet Bird*. He also composed some beautiful chamber music. His son, Christopher (1615-76), is the member of the family second to him in importance. See E. H. Fellowes, *Orlando Gibbons*, 1925.

Gibbons, Stella Dorothea (1902-), novelist, *b.* London. She studied journalism at Univ. College there, and worked for 10 years in Fleet Street. In 1933 she married Allan Bourne Webb, an actor, and in the same year her first novel, *Cold Comfort Farm*, a clever skit on the rural novel, won the Femina Vie Heureuse prize. *Christmas at Cold Comfort Farm* appeared in 1940, and *Conference at Cold Comfort Farm* in 1949. Others of her novels are *Bassett*, 1934, *Enbury Heath*, 1935, *Miss Linsey and Pa*, 1936, *Nightingale Wood*, 1938, *My American*, 1939, *The Bachelor*, 1944, *The Matchmaker*, 1949, and *The Shadow of a Sorcerer*, 1955. *Beside the Pearly Water*, 1954, is a collection of short stories, and her *Collected Poems* appeared in 1950.

Gibbs, James (1682-1754), architect, *b.* near Aberdeen, was educ. in that city; then studied in Rome, returning to Britain 1709. He then enjoyed a very large practice in London. His chief buildings were: St Mary-le-Strand, 1714-23; St Martin-in-the-Fields, 1722-6; St Peter, Vere Street, 1722-4; the steeple of St Clement Danes, 1719--all in London; new wing of King's College, Cambridge, begun 1724; the 'Radcliffe Camera' at Oxford, 1737-47 (his masterpiece); and St Nicholas, Aberdeen, 1752. Most of his country-houses have been demolished. He wrote useful books on architectural drawing and design.

Gibbs, Josiah Willard (1837-1903), Amer. physicist, *b.* New Haven, Connecticut. From 1871 prof. of mathematical physics at Yale Univ. Although his scientific papers were not numerous all were important. His fame was made by a paper, pub. in the *Transactions* of the Connecticut Academy, 1875-8, and entitled 'On the Equilibrium of Heterogeneous Substances,' which led to the estab. of the 'phase rule' of chemical equilibrium and change (q.v.). Other papers: *Graphical Methods in the Thermodynamics of Fluids*, 1873, *Methods of Geometrical Representation of the Thermo-*

dynamic Properties of Substances by Means of Surfaces, 1873, and treatises on the electro-magnetic theory of light, 1882-8, and on vapour densities. In 1902 he pub. *Principles in Statistical Mechanics developed with special reference to the Rational Foundations of Thermodynamics*. In 1879 he was elected Foreign Member of the Royal Society, and was awarded the Copley Medal in 1901. See W. L. Miller, *Method of Willard Gibbs in Thermodynamics*, 1925.

Gibbs, Sir Philip Hamilton (1877-), Brit. journalist, was privately educ. He became literary editor successively of the *Daily Mail*, *Daily Chronicle*, and *Tribune*. His novel *The Street of Adventure*, 1909, tells of Fleet Street. As special correspondent he did brilliant work with the allied forces in the First World War, and was made a K.B.E. in 1920. A number of books, including *Realities of War*, 1920, were based on his war experiences. A Rom. Catholic, he performed the great journalistic feat of interviewing the Pope. He wrote many novels, of which the most noteworthy are *The Middle of the Road*, 1922, and *The Cross of Peace*, 1933. Among the best of his other books are *Ten Years After*, 1924, *The Day After Tomorrow*, 1928, *European Journey*, 1934, and *The New Elizabethans*, 1953, a study of the modern Eng. people. *The Pageant of the Years*, 1947, and *Crowded Company*, 1949, are autobiographical.

Gibeah, city occupied by the Benjamites, the modern Tell el-Ful, 3 m. N. of Jerusalem, partly excavated by Albright in 1922-3. He discovered that the original fortress was built towards the end of the 13th cent. bc and was burnt near the end of the 12th cent. bc. It was the scene of the outrage described in Judges xix, for which the Benjamites were decimated. The city was rebuilt and fortified afresh; it prospered as Saul's bp. and cap., c. 1030 bc (1 Sam. x. 26; xiv. 2; xxvi. 1).

Gibello, Monte, see ETNA.

Gibeon, anct city of Palestine, 5 m. NW. of Jerusalem. The vil. of El-Jib, remarkable for its springs, now occupies the site, which is a solitary hill overlooking a corn valley. It was the scene of the combat between the fighters of David and of Ishbosheth (2 Sam. ii. 12-32), of the murder of Amasa by Jonab (*ibid.* xx. 8-10), and of the victory of Joshua over the 5 kings of the Amorites who were besieging the tn because the Gibeonites had won a truce from Joshua by deceit and trickery (Joshua ix. x).

Giblin, Lyndhurst Falkiner (1872-1951), Australian economist, *b.* Hobart, educ. Univ. College, London, and King's College, Cambridge. G. was gov. statistician in Tasmania, 1920-8, and acting Commonwealth statistician, 1931-2. In 1929 he was appointed prof. of economics at Melbourne Univ. His achievements were by no means confined to the academic world, for as director of the Commonwealth Bank, 1935-42, a member of the Commonwealth grants commission, 1933-1936, and chairman of the Commonwealth

financial committee, 1939-46, G. was able to exert considerable influence on economic developments in Australia. He pub. *The Growth of a Central Bank: the Development of the Commonwealth Bank of Australia, 1924-45*, 1951.

Gibraltar (Sp. *Jibraltar*; Arab. *Jebel Tariq*), Brit. strongly fort. tn and promontory in the extreme S. of Cádiz (q.v.), Spain, 16 m. N. of Ceuta (q.v.) across the Strait of G., and forming the E. horn of the Bay of Algeciras or G. It is an important strategic point of control for the W. Mediterranean. Known to the ancients as Calpe, it formed, with Mt Acha near Ceuta, the 'Pillars of Hercules' (q.v.). The great promontory, of brownish-grey limestone or marble, is connected with the

extended into Algeciras Bay. The fine harbour has 2 moles, 1100 and 700 yds long. There are a lighthouse and an important wireless station situated by Europa Point on the S. The tn has 2 main divs., N. tn and S. tn, while the part on which the lighthouse is situated is styled Europa. In the tn, however, are some slums, tawdry shops, and restaurants. Alameda Park is a moderate-sized garden in the central part of G., and the governor's house on the 'convent' is situated a m. away in the main street. There is an admiral's residence, an official house called The Mount on the Europa Road, half a m. S. of the gardens. The theatre is half a m. N. of the gardens. There are also the exchange building and the barracks. G.



GIBRALTAR

F.N.A.

mainland by an isthmus of sand. It is shaped like an enormous lion, 3 m. long, averaging $\frac{1}{2}$ m. broad, reaching upwards over 1400 ft above sea-level, except on the W., where it slopes more gently to the sea. Though barren in appearance its vegetation includes capers, asparagus cacti, and aloes, and its fauna partridges, woodcocks, pigeons, rabbits, and small monkeys (Barbary apes), the only native monkeys of Europe. There are numerous caverns and galleries cut out in the rock, the largest being St Michael's, with a hall 230 ft long. G. is in fact a labyrinth of tunnels, an underground city divided into many self-contained parts, and still tunneling goes on, to accommodate great power plants, hospitals, laundries, bakeries, kitchens, ammunition stores, hoists, gun emplacements, and living accommodation for thousands of men. The narrow ledges bristle with wireless masts and radar equipment. The Sp. lines are near the point of junction of the rock of G. and the mainland, the space between being called neutral ground. On the flat isthmus joining the rock to Spain is the aerodrome,

is the see of an Anglican and a Rom. Catholic bishop. There are Anglican and Rom. Catholic cathedrals, and 2 other Anglican and 4 other Rom. Catholic churches. There are 16 primary schools and 4 secondary schools. A Crown colony of Great Britain, controlled by a governor, and executive council, and (since 1950) a legislative council, G. is of extreme importance as a fuelling station and for its control of the Mediterranean Sea. It has been a free port since 1704, but, for revenue purposes, there are import duties on malt liquors, wine and spirits, tobacco, motor spirit, perfumery, and coffee. Industries are of no importance, but there is a fair transit trade at the port, and G. is becoming a popular tourist centre. There is cable communication with the Continent, Tangier, the Mediterranean E. ports, and England.

History.—The fortress was taken, AD 711, by the Saracen chief, Tarik ibn Ziad. The Moors finally ceded it to Spain, 1462. After 1540 it was extensively fortified by Charles V. In 1704 it was captured by the Eng. and Dutch

under Rooke (q.v.). It was subsequently often besieged by the Spaniards, notably 1779-83, when it was gallantly defended by Heathfield (q.v.) against the united Fr. and Spanish. It was ceded to Great Britain by the treaty of Utrecht in 1713, renewed by the treaty of Versailles in 1763. Since 1897 a new mole and enclosed deep harbour has been built at the N. end. In the Second World War, as in the First World War, G. was of paramount importance as a pivotal point of Britain's sea lines; for a successful thrust either at G. or at Suez or at both together would have meant her expulsion from the Mediterranean and jeopardised her hold on the Middle E. On the other hand it may be that the Nazis in the Second World War hesitated to attack Spain for fear of dispersing their own resources over too extended an area without appreciably increasing them; besides which Spain would have been of little practical aid against G. Early in 1942, with Italy in the war, it was questioned by many in Britain whether Malta could be held and whether it should even be attempted to be held. This was the school of thought which for some years had argued that, in case of war with Italy, it would be wisest to abandon the Mediterranean and to be content with sealing it at both ends through control of G. and Suez; and the arguments for this course had been reinforced by the collapse of France. Fortunately other counsels prevailed—strengthened by the amazingly successful defence of Malta. Again, in the late autumn of 1942 the Brit. command of the straits of G. prevented any serious interference with the Anglo-Amer. expedition to North Africa, whether by Axis submarines or by air patrols, when passing through the straits. Naturally, the bottle-neck at the straits invited a U-boat concentration in the surrounding area, but the most efficient organisation for patrol and protection, which was rendered possible by the very fact of holding G., kept losses down to a low level in the first 6 months of 1943, when 11,000,000 gross tons of shipping was escorted by the R.N. into the ports of North Africa. There was always a danger that the Ger. reply to the allied invasion of North Africa would be an invasion of Spain and the occupation of bases dominating the straits without opposition from Gen. Franco. But before the end of 1942 there were signs that doubts were beginning to influence the mind of Gen. Franco, for a move towards a firmer neutrality might be seen in overtures to Portugal for the formation of an Iberian bloc. The civilian pop. is mainly of Sp. and It.

J. Drinkwater, *History of the Siege of Gibraltar*, 1885; A. M. Monti, *Historia de Gibraltar*, 1851; F. Sayer, *History of Gibraltar*, 1862; J. Mann, *History of Gibraltar*, 1870; H. Field, *Gibraltar*, 1889; E. R. Kingdon, *Gibraltar under Moor, Spaniard, and Briton*, 1938; G. T. Garratt,

Gibraltar and the Mediterranean, 1939; Stetson Conn, *Gibraltar in British Diplomacy in the Eighteenth Century*, 1942; and R. Henry, *Journey to Gibraltar*, 1943.

Gibraltar, Strait of (anc. Fretum Herculeum), entrance from the Atlantic to the Mediterranean, having a length of 50 m. and a breadth varying from 9 to 23 m. It is flanked on the N. by Spain, on the S. by Morocco in Africa. See HERCULES, PILLARS OF.

Gibson, Charles Dana (1867-1944), Amer. artist, b. Roxbury, Massachusetts, son of Charles de Wolf G. He attended for 1 year the schools of the Art Students' League in New York, and first drew for the comic weekly, *Life*. It was his portrayal of the Amer. girl, especially of an idealised type, in which health, refinement, and extreme dignity were suggested, that estab. his name and made magazines vie with one another for his drawings of what came to be known as the G. girl. After having made a fortune by contributing to *Collier's Weekly*, in which appeared the famous 'Education of Mr Pipp,' G. essayed portraiture in oils, but eventually returned to his designs in pen and ink.

Gibson, Edmund (1669-1748), Eng. divine, who in 1692 brought out an improved Eng. trans. of Camden's *Britannia*. His great work was *Codex juris ecclesiastici Anglicani*, 1713, written to plead the privileges of the Convocation. Bishop of Lincoln, 1716; bishop of London, 1720.

Gibson, Edward, see ASHBORNE, BARON. **Gibson, John** (1790-1866), sculptor, b. Gylfin, near Conway, son of a market gardener. For some years he worked in the studio of Canova, and later became for a time the pupil of the Dane Thorwaldsen. But the old Gk sculptors were his true masters, and their influence is reflected in his works. Gk mythology supplied him with his subjects, 'Bacchante and Faun,' 'Amazon thrown from her Horse,' 'Proserpine,' 'Sappho and Psyche,' etc. It was the knowledge that Pheidias and Praxiteles had coloured their statuary that suggested to him the tinting of his 'Venus,' 1854, and other of his works, a process which was naturally regarded as a daring innovation. It was moreover in classical garb (the Rom. toga) that he insisted on representing Peel (Westminster Abbey) and Huskisson (Liverpool). But the above are merely external illustrations of his paganism in art. In his reliefs, such as 'Hours leading the Horses of the Sun,' he shows an appreciation of the true nature of the plastic art. Among his many imposing monumental works may be mentioned the group of Queen Victoria with Clemency and Justice in the Houses of Parliament. See T. Matthews, *J. Gibson*, 1911.

Gibson, Wilfrid Wilson (1878-), poet, b. Hexham, Northumberland. He was for a time a social worker in the E. end of London, and during the First World War he served in the ranks. These experiences form the background of much of his work.

Most of his poems—notably the 17 dramatic pieces which make up *Daily Bread*, 1910, and the work *Livelihood*, 1917—present the normal tolling life of man in our modern industrial world. There is nearly always a story even in his shortest pieces, and the story is generally full of interest. Though he chooses unlovely themes, the ugliness of the hand-to-mouth existence, he is certainly the 'laureate of modern industrialism' (A. C. Ward), who sings of a man-made hell of machines and creatures of the machines in verse which creates the illusion of the glare of furnaces and the grime and murk of industry. Two of the most striking of his individual pieces are 'Flannan Isle' and 'The Ice-Curt.' His poems include, besides those mentioned, *Stonefolds*, 1907, *Fires*, 1912, *Thoroughfares*, 1914, *Borderlands*, 1914, *Battle*, 1915, *Friends*, 1916, *Whin*, 1918, *Home*, 1920, *Neighbours*, 1920, *I Heard a Sailor*, 1925, *The Golden Room*, 1928, *Hazards*, 1930, *Highland Dawn*, 1932, *Fuel*, 1934, *Coming and Going*, 1938, *The Alert*, 1941, *Challenge*, 1942, *The Searchlights*, 1943, *The Outpost*, 1944, and *The Island Stag*, 1947. He also wrote a number of plays, including *Womenkind*, 1912, *Kestrel Edge*, 1924, and *Within Four Walls*, 1950.

Giddings, Joshua Reed (1795–1864), Amer. statesman, sat from 1838 to 1859 in the national House of Representatives, first as a Whig, later as a Free-soiler, and eventually as a Republican. The abolition of slavery was very materially assisted by his able and outspoken speeches. When the slaves of the *Creole* slew their captain and claimed their liberty (1841) he courageously asserted that in 'resuming their natural rights to liberty' they 'violated no law of the U.S.A.' In 1842, when Congress passed a vote of censure on him, he resigned his seat, but his immediate re-election proved that the public fully recognised the value of his disinterested and splendid work.

Gide, André Paul Guillaume (1869–1951), Fr. novelist and critic, b. Paris. He was educ. at École Alsacienne and Lycée Henri IV. At one time he conducted *La Nouvelle Revue Française*. A great Fr. writer, G. began in a vein of turgid romanticism veiled as symbolism; but *Le Voyage d'Urien*, 1893, *Les Nourritures terrestres*, 1897, and *L'Immoraliste*, 1902, would have been ignored but for the soundness of their ideas and sentiment and for the promise which was to develop much later in *Si le grain ne meurt*, 1921. *Les Caves du Vatican*, 1914, is a fantastic tale which seems to exploit the moral theory of acts without motive, a paradox exemplified also in the work *L'acte gratuit* (a tale of homicide without reason), the former of which, says Prof. Denis Saurat, would have been a masterpiece had it been possible not to take it seriously. *Les Faux-Monnayeurs*, 1925, depicts the rebellion of youth, and the struggle between the 2 generations. A remarkably different outlook seems to

pervade his 2 delightful travel books, *Voyage au Congo*, 1928, and *Retour du Tchad*, 1929, books completely antithetical to the spirit which seems to inform his 'motiveless' stories. The substance of G.'s writings is, all through, his own self, a *moi* which has not achieved any cohesion and yet up to a point seems to reflect everybody's outlook. What he seems to be driving at in his more complex works is that sincerity is the prime virtue but consists in having no fixed beliefs. But above all G. is a supreme stylist, as may be seen in his autobiographical *Si le grain ne meurt* and his *Journal*, 1939, and the 2 African travel books, and many Fr. critics hold that he is the greatest modern writer of French. His *Journal* will probably remain his most read work. Some of the numerous themes which recur most frequently in it include his home at Cuverville, travel, piano-playing, Racine, Dostoevsky, homosexuality, his wife, the Gospels, the devil, Browning, insomnia, temptation, the problem of style, animals, Pascal, health, Conrad, the Catholic Church, children, and Bossuet. Even so summary a list serves to afford some indication of G.'s main preoccupations. It also indicates the peculiar rhythm of his existence, in perpetual oscillation between discipline and anarchy, between classicism and revolt, between austerity and sensuality. What is significant in G. and emphasises his originality as a writer is that he has no wish to suppress any of these extremes, nor to decide between the alternatives suggested to him by his own nature. He is equally attracted by heaven and hell, and is disposed to think that the kingdom of God partakes of both, particularly because, as the Gospel text teaches which he quotes so often, that kingdom is within you. G. was awarded the Nobel prize for literature in 1947. His other works include *Les Cahiers d'André Walter*, 1891, *Les Poésies d'André Walter*, 1892, *La Tentative Amoureuse*, 1893, *Paludes*, 1895, *Le Prométhée enchaîné* and *Philoctète*, 1899, *Lettres à Angèle*, 1898–99, 1900, *Le Roi Candaulé* (drama), 1901, *Saül* (drama), and *Prétextes*, 1903, *Amyntas*, 1906, *Le Retour de l'enfant prodigue*, 1907, *Dostoevsky d'après sa correspondance*, 1908, *La Porte étroite*, 1909, *Oscar Wilde*, 1910, *Nouveaux Prétextes* and *Isabelle*, 1911, *Bethsabé*, 1912, *La Symphonie pastorale*, 1919, *Corydon*, 1920, *Numquid et tu . . . ?* 1922, *Incidences*, 1924, *Caractères*, 1925, *Dindiki* and *Faits divers*, 1928.

See S. Braak, *A. Gide et l'âme moderne*, 1923; C. du Bos, *Le Dialogue avec André Gide*, 1929; R. Fernandez, *André Gide*, 1931; L. Pierre-Quint, *André Gide: sa vie, son œuvre*, 1932, revised ed. 1952; Klaus Mann, *André Gide and the Crisis of Modern Thought*, 1948; *The Journals of André Gide* trans. by Justin O'Brien, vol. 1, 1889–1913, 1947; vol. II, 1914–1927, 1948; *Homage to André Gide* (Gallimard, 1951).

Gide, Charles (1847–1932), Fr. political economist, b. Uzès (Gard). Prof. at univ. of Paris, 1898–1920. Early became attached to Christian Socialist movement.

Works include *Principes d'économie politique*, 1884, *La Coopération*, 1900, *Histoire des doctrines économiques* (with Charles Rist), 1909, *Premières notions d'économie politique*, 1921, and *La Coopération à les colonies communistes et Coopération*, 1930.

Gideon, warrior judge of Israel, won the name Jerubbaal ('Let Baal plead') for destroying Baal's altar at Ophrah, his bp. But his great achievement was to overwhelm the Midianites near Mt Gilboa (Judges vj.-vii.).

Gielgud, Sir Arthur John (1904-), actor, b. London. His father, Frank G., was a member of a Polish family which had settled in England some years previously. On his mother's side he is connected with the celebrated theatrical Terry family (q.v.). His mother was a daughter of Kate Terry and a niece of Ellen Terry. G. was educ. at Westminster School, and then at the Royal Academy of Dramatic Art. His first appearance on the stage was in 1921 at the Old Vic Theatre as the herald in *Henry V.* Early in 1928 he visited New York, playing at the Majestic Theatre in *The Patriot*, in which he took the part of the Grand Duke Alexander. In 1929 he was again with the Old Vic Company, playing a number of Shakespearian roles, including Hamlet and Macbeth. The following year he played Hamlet at the Queen's Theatre and also John Worthing in Wilde's *The Importance of Being Earnest*. With these 2 roles he assured his reputation as one of the leading actors in the country. He then scored a big success with his production of *Richard of Bordeaux*, in which he played the title role. In 1939 he was at the Lyceum Theatre as Hamlet, which he played with the Old Vic Company at Elsinore on the outbreak of war. During the war years he toured in plays for the army and the R.A.F. in the U.K., Malta, and Gibraltar. In 1944 he formed his own company for a season of repertory at the Haymarket Theatre, playing Hamlet, Valentine in *Love for Love*, Oberon in *Midsummer Night's Dream*, and Ferdinand in *The Duchess of Malfi*. He played Benedick in *Much Ado About Nothing* in 1952 and 1955, Lear in 1955, and Prospero in *The Tempest* in 1957/58. In 1956 he played the lead in Noel Coward's *Nude With Violin*. He has also appeared in films, notably in *The Good Companions*, 1932, as Disraeli in *The Prime Minister*, 1940, and in *Richard III*, 1956. In 1953 he was knighted.

Gien, Fr. tn in the dept of Loiret, on the Loire. It was severely damaged in the Second World War. There is a castle dating from 1494. Porcelain is manufactured. Pop. 7700.

Giesebrecht, Friedrich Wilhelm Benjamin von (1814-89), Ger. historian, b. Berlin, and studied under Ranke (q.v.). He was prof. of hist. at Königsberg, 1857, and at Munich, 1862. His most valuable and exhaustive work is his *Geschichte der deutschen Kaiserzeit*, 1855-94, dealing with events up to 1181.

Gieseler, Johann Karl Ludwig (1793-1854), Ger. writer on church hist., graduated in philosophy from Halle in 1817. In 1819 he was appointed to the chair of theology at Bonn, and in 1831 accepted a similar position at Göttingen. His prin. work is *Lehrbuch der Kirchengeschichte* (5 vols.), 1824-57.

Giesen, Ger. tn in the Land of Hessen (q.v.), on the Lahn (q.v.), 40 m. NNE. of Wiesbaden. It rose to importance after the foundation in the tn of a univ. in 1607. The univ. (with which Liebig (q.v.) was connected) no longer exists, but there is an agric. and veterinary college, and there is a medical research institute. There are tobacco, engineering, and glass industries. Pop. 47,000.

Giffard, H. S., see HALSBURY, EARL OF.
Giffard, Walter (d. 1279), archbishop of York. He was consecrated bishop of Bath and Wells, 1265, and was made chancellor of England after the battle of Evesham. Pope Clement IV appointed him archbishop of York, 1266, and he resigned chancellorship. G. received great seal on death of Henry III, was principal of the three governing England till new king's arrival (1274), and one of the guardians of England during Edward I's absence in 1275.

Gifford, William (1757-1826), critic and poet, b. Ashburton, Devon. Early left an orphan, he was rescued from a 'state of savage melancholy' by Cooksley, a local surgeon, who sent him to school and afterwards to Oxford. His ability and sad story persuaded Lord Grosvenor to appoint him tutor to his son and to afford G. his home as an asylum (1782). From this time forth G. devoted himself to writing. His *Baviad*, 1794, and *Maeviad*, 1795, were powerful satires directed against the Della Crusceans, and the ineptitudes and corruption of modern dramas respectively. In politics he was an enthusiastic admirer of Pitt, a good hater of the Fr., and a bitter opponent of Radical principles. Among his illustrious associates were Pitt, Canning, Frere, and the marquess of Wellesley. G. was the first editor of the *Quarterly Review*, with which he was connected from 1809 to 1824, but though by his vigorous political partisanship he secured for it an ever-increasing circulation, he nevertheless blackened its pages with a cruel and prejudiced attack on Keats's *Endymion* and many similar onslaughts on the writings of Shelley, Lamb, Hazlitt, and others. See W. Hazlitt, *Letter to William Gifford*, 1819; and R. B. Clark, *W. Gifford, Tory Satirist, Critic, and Editor*, 1930.

Gift, transfer of property without valuable consideration (q.v.) to a person who accepts the property either by himself or through his trustee. To constitute a G. there must be both a complete transfer and an intention to give. As to what amounts to the former, much depends on the nature of the property. Such a movable chattel as a bicycle would require no more than delivery accompanied, as the law says, by *verba de*

praesenti doni (i.e. by words indicating that a G. is made). The transfer need not, however, be to the person intended to be benefited, but may be to a trustee for the benefit of the donee. A donee is not bound to accept a G., but if the G. be made by deed it vests in the donee without acceptance until he repudiates it. A promise to make a G. in the future gives no right whatever. An infant may accept a G. and repudiate it on attaining 21. A *donatio mortis causa* is a G. made by a man in contemplation of his death from an existing illness. Following the principles of the civil law (q.v.), the law is that a 'death-bed gift' is made only on condition that the thing shall be returned if the donor recovers, and that it is revoked by the predecease of the donee. A *donatio mortis causa* is ineffectual without delivery, either to the donee or someone on his behalf. It appears to be settled law that bank shares, railway stock, consols, and building society shares cannot be the subject of a *donatio mortis causa*, and cheques given must be cashed or negotiated before the donor dies. Delivery of the key of a safe would be effectual to pass securities in the safe.

Gifu, industrial and commercial city of Gifuken, Japan, about 20 m. N. of Nagoya. The seat of the prefectural gov., it is also noted for silk and chemical fibre textiles, paper, as well as its centuries-old tradition of handicraft (paper lanterns and umbrellas). Pop. 260,000.

Giga, Gigue, see JIG.

Giggleswick, par. and vil. of Yorks (W. Riding), 16 m. NW. of Skipton. The public school was founded in 1512; near by is an ebbing and flowing well. Pop. 800.

Giggleswick School, public school for boys founded in 1512 at Giggleswick, Yorks, and granted a royal charter by Edward VI in 1553. It was reorganised under a new scheme in 1872 (amended in 1903, 1910, and 1922).

Gigli, Beniamino (1890-1957), It. operatic tenor, b. and educ. at Recanatì, his father, a shoemaker, being the sacristan of the cathedral there. At the age of 7 he joined the cathedral choir. He studied at the conservatory in Rome under Cotogni and Rosati. He made his début on the operatic stage at Rovigo, near Venice, in 1914, as Enzo in Ponchielli's *La Gioconda*. He then toured the chief It. cities and sang in Paris, Berlin, Madrid, and elsewhere in Europe. He also sang at the Scala in Milan, where he estab. his reputation as one of the best tenors of the day. In 1920 he went to New York as a member of the Metropolitan Opera Company, and made his début there on 17 Nov. of that year as Faust in a revival of Boito's *Meftistofele*. He remained with the Metropolitan Opera until 1932, singing in Fr. and It. opera. He also sang at Covent Garden and in opera houses of Budapest, Vienna, Hamburg, Munich, and Zürich. As a concert artist he gave recitals in most of the large cities of Europe, the U.S.A., and South America.

Gigue, see JIG.

Gijón, Sp. tn in the prov. of Oviedo, lying on a small peninsula in the bay of Biscay. It is on the site of a pre-Rom. settlement, and Rom. remains have been found. There are many fine anct. buildings, including palaces and churches, and there are museums and libraries. The tn is an important manufacturing centre, with metallurgical (copper, iron, and steel), chemical, glass, pottery, and tobacco industries. It ships large quantities of coal from the Mieres and Langreo (qq.v.) dist., and has prosperous fisheries. Its port is called E. Musel, and is used by trans-Atlantic ships. There are sev. good beaches near by. Pop. 111,000.

Gil Blas, see LEWAKE, ALAIN RENÉ.

Gila Monster, popular name for the poisonous lizard called *Heloderma suspectum*, which frequents the sandy wastes of



GILA MONSTER

Arizona, Texas, and New Mexico. In colour it is bright orange and black, and its victims are chiefly birds and small animals.

Gilan, prov. of Persia, bounded by the Caspian Sea on the N., Mazandaran on the E., Azerbaijan on the W., and Qasvin and Khamseh on the S. It is low-lying, swampy, and unhealthy towards the Caspian, but more salubrious where the ground rises to the S. It has large forests. Rice is cultivated on the Caspian littoral; tea, olives, citrus fruits, and tobacco are also produced. The fisheries are good.

Gilbert, Sir Alfred (1854-1934), sculptor and goldsmith, studied under Cavalier at the Ecole des Beaux-Arts in Paris and also in the studio of Sir Edgar Boehm, R.A. At Rome and Florence he was an enthusiastic admirer of the masterpieces in the galleries of sculpture, and his admiration is reflected in his 'Mother and Child' and 'Perseus Arming,' which were assuredly inspired by Renaissance work. His 'Icarus' attracted much attention in the Royal Academy Exhibition of 1884, but of his work known to the general public the most highly appreciated is the Shaftesbury memorial fountain ('Eros'),

1885, in Piccadilly, London. G. also executed the statue of Queen Victoria at Winchester, 1888, the memorial to the duke of Clarence, and fine busts of G. F. Watts, Sir Henry Tate, and many others. G. received Brit. Sculptors' Society gold medal, 1926. See Sir J. Hutton, *Life and Work of Alfred Gilbert*, 1903, and Isabel McAllister, *Alfred Gilbert*, 1926.

Gilbert, Cass (1859-1934), Amer. architect, b. Zanesville, Ohio. Began practice in 1883. Was noted for his skyscrapers—especially the Woolworth Building, New York. He designed the Capitol and other buildings at St Paul; Essex Co. Court House, Newark, New Jersey; Agric. Building, Omaha Exposition, 1897; U.S. Custom House, New York; Festival Hall, St Louis Exposition; Central Public Library, St Louis; Detroit Public Library; general plans of univ. of Minnesota, univ. of Texas, and completion of Arkansas Capitol at Little Rock; U.S.A. Treasury Annex, Washington, D.C.; W. Virginia State Capitol; U.S.A. Chamber of Commerce. President Amer. Institute of Architects, 1908-9.

Gilbert, Sir Humphrey (c. 1539-83), Eng. navigator, educ. at Eton and Oxford. He

home the tidings of the leader's untimely death. See life by D. B. Chidsey, 1932.

Gilbert, J. H., see **LAWES**.

Gilbert, Sir John (1817-97), painter and illustrator, b. Blackheath, sketched and drew from his earliest childhood, and was self-taught except for some lessons from Lance, the fruit painter. He exhibited at the Royal Academy from 1838, and continued, except between 1851 and 1867, till his death to exhibit there historical and illustrative themes such as 'Don Quixote's First Interview with the Duke and Duchess,' 1842, 'Holbein painting the Portrait of Anne Boleyn,' 1842, 'Charlemagne visiting the Schools,' 1846, 'Rembrandt,' 1867, and 'Naseby,' 1873. Two hundred and seventy of his water-colours were hung from 1852 onward in gallery of the Old Water Colour Society, of which he became president in 1871. The success of the *Illustrated London News* is said to have been due not a little to his engravings. He is more considerable as a vigorous and prolific illustrator than as a painter.

Gilbert, Sir John Thomas (1829-98), founder of the Public Record Office in Dublin, was for many years (1855-89) in charge of the library of the Royal Irish Academy, an office which he found very congenial, as it gave him every facility for satisfying his passion for hist. and antiquities. He ed. the civic records of his bp., Dublin, as far back as 1730, and was the author of *Historical Essays on Ireland*, 1851, *History of Dublin*, 1854-9, and *Contemporary History of Affairs in Ireland*, 1641-1652, 1880. See life by his wife, 1905.

Gilbert, William (c. 1544-1603), b. Colchester, father of the science of magnetism, studied in Cambridge and Italy, and about 1573 was admitted to the College of Physicians in London. Queen Elizabeth made him her physician-in-ordinary, but his fame rests on a far more substantial basis than royal favour; for in 1600 he pub. his exhaustive and original treatise on magnetism, viz. *De magnete, magneticisque corporibus, et de magno magnete tellure*, a work which earned him the admiration of Galileo and an encomium from Erasmus containing the words (he is) 'great to a degree that is enviable.' In his realisation of the affinity and essential difference of magnetism and electricity, and of the communicability of telluric magnetism, in his fine conception of the whole earth as a great magnet influencing the direction of the magnetic needle N. and S., and his invention of terms 'electric emanations' and 'electric attractions,' etc., he may be said to have estab. all the 'fundamental facts' of his science. See the Eng. trans. of *De Magnete* by S. P. Thompson, 1900.

Gilbert, Sir William Schwenck (1836-1911), humorist and playwright, b. London, the son of a novelist, and a descendant of Sir Humphrey G., the explorer. His schooling was received in Boulogne and Ealing, and in 1856 he graduated from King's College as a B.A. of the univ. of London. For 4 years (1857-61) he led



SIR HUMPHREY GILBERT

served as a soldier in Ireland and the Netherlands, was in Parliament, and pub. his famous *Discourse on a North-West Passage to India*, 1576, before he finally obtained his much-coveted patent from the queen to 'discover and possess' remote 'heathen lands not actually possessed of any Christian prince or people.' The immediate result of this charter was the fruitless expedition of 1578-9, when Raleigh sailed in his company. In 1583 he fitted out another fleet, formally occupied Newfoundland, where he landed in Elizabeth's name, and having planted the first Eng. colony was on his way home when the little frigate, the *Squirrel*, in which he insisted on sailing, captured, and the *Golden Hind* was left to carry

a clerk's life in the education dept of the Privy Council, but finding such an existence too slow decided to follow law, and was called to the Bar in 1864. From this year onward his time was largely occupied with all manner of literary activities, though he found time to serve as magistrate for Middlesex (1891), and to hold a captaincy in the volunteers. For many years after 1861 G. was a popular contributor of comic verse and illustrations, signed 'Bab,' to *Fun*, and his *Bab Ballads*, which appeared in 1869, were a collection of his contributions. These lyrics, together with *More Bab Ballads and Songs*

Penzance, 1880; *Patience*, 1881; *Iolanthe*, 1882; *The Mikado*, perhaps the masterpiece, 1885; *Ruddigore*, 1887; *The Gondoliers*, 1889; and *The Yeoman of the Guard*, 1888, the last-named undoubtedly containing some episodes of true poetry. These operas are one and all animated by a rich vein of humour which consists in 'a logical topsy-turvydom,' and of sly hits at the follies and foibles of the day, the satire being of such a disarming urbanity as to be free from all the odium which usually attaches itself to satirists. He was knighted in 1907. See Edith A. Browne, *N. S. Gilbert*, 1907; F. Cellier and



LAGOON ISLAND, GILBERT AND ELLICE ISLANDS

of a *Savoyard*, are full of splendid nonsense and of graceful whimsicalities. For some time G. acted as dramatic critic for the *Illustrated Times*, and it was his work on this paper which turned his attention to the stage. From 1866, the year of his success with a burlesque entitled *Dulcamara*, he continued to write original plays, among them being a clever fairy play entitled *The Palace of Truth*, 1870; *Pygmalion and Galatea*, a mythological comedy, 1871; *Sweethearts*, 1874; and *Dan'l Druce*, 1876. *Fogerty's Fairy and other Stories* is the best collection of his tales, most of which first appeared in magazine form. His famous partnership with Sir Arthur Sullivan (q.v.) dates from 1871. At the Savoy, under the management of Richard D'Oyly Carte, there appeared in rapid succession a series of delightful operas, of which G. was the librettist, the most popular of them being *H.M.S. Pinafore*, 1878; *The Pirates of*

C. Bridgeman, *Gilbert and Sullivan and their Operas*, 1914; and H. Pearson, *Gilbert and Sullivan*, 1935.

Gilbert and Ellice Islands, Brit. colony in SW. Pacific, comprising some 3 main groups of is. scattered in the form roughly of a triangle, the approximate geographical positions of whose vertices are N. (Gilbert Is.) 3° N., 173° E.; E. (Phoenix Is.) 4° S., 171° W.; S. (Ellice Is.) 11° S., 179° E. The colony comprises the Gilbert Is. proper; the Ellice Is.; Ocean Is.; the Phoenix group; and, away to the E., and immediately to the S. of Hawaii, the 3 detached is. of Washington, Fanning, and Christmas. The colony was built up gradually between 1877 and 1937; and, since 1939, 2 of the atolls of the Phoenix group (pop. 850), Canton and Enderbury, have formed an Anglo-Amer. condominium, the value of the is. being enhanced in these days of trans-Pacific air travel. With the sole exception of Ocean

Is. all the is. are coral atolls, which explains their relatively tiny land area of 400 sq. m. in relation to the vast area of sea over which the groups are scattered (2,000,000 sq. m.). Christmas Is., scene of the 1957 Brit. H-bomb tests, occupies about half the land-area. Ocean Is. or Banaba, lying about 250 m. from the Gilbert group proper (1500 ac.), is rich in phosphate worked by the Brit. Phosphate Commission. It is 280 ft high and covered with vegetation (pop. 2880). The colony H.Q. is Tarawa. In the Second World War Betio Is. in the Tarawa atoll was the site of a Jap. airfield and stronghold occupied by most of the 6000 Jap. troops in the Gilbert Is. The Amer. marines landed in Nov. 1943, with tanks and artillery, but only captured the stronghold after a fierce 3-day struggle which cost them 3800 casualties. The total pop. of the G. and E. I. is only 36,000 and consists of Micronesians and Polynesians. The pop. of the Gilbert Is. in 1947 was 29,923; that of the Ellice Is., 5066. The Gilbertese are Micronesians, the Ellice islanders Polynesian. The Gilbertese are inclined to be reserved, but the Ellice islanders are probably the most vivacious of all Polynesians. Life is very austere on these is., for, apart from the coconut and pandanus, nothing grows easily, though a coarse tuber, the 'babai' (*Xanthosoma sagittifolium*), is cultivated in garden pits. Politically the Gilbertese and Ellice islanders are remarkably advanced for primitive peoples, working for themselves a sound form of local gov., with native magistrates and headmen (*kaubure* in Gilbertese and *faipule* in Ellice). There are also in each is. a chief *kaubure*, a native scribe, and a local police force. Each council or 'native government' makes its own local regulations subject to the approval of the dist. officer (Brit.) and criticises the draft laws of the colony to be administered by the local courts before they are sent to the High Commissioner for the W. Pacific for enactment.

The main exports are Ocean Is.'s phosphate rock (285,000 tons in 1953, but a wasting asset) and copra (7000 tons in 1953). Export duty on copra and tax and royalty paid by the Brit. Phosphate Commission are the mainstay of the budget of the colony, which is not grant-aided. The only European inhab. are scattered Her Majesty's Oversea Service officers of the colony gov., some 60 employees of the Brit. Phosphate Commission, about 50 of Pan-American Airways on the Anglo-U.S.A. condominium is. of Canton in the Phoenix group, a dozen of the cable company at its Fanning Is. station, and a few Sacred Heart and London Missionary Society missionaries. Contact with the outside world is maintained by occasional visits from copra ships bound for the U.K.; 6 Brit. Phosphate Commission phosphate ships a month plying between Melbourne and Ocean Is., which is within the ambit of small local vessels from the groups; the Brit. Phosphate Commission recruiting

ship making the ann. tour of the groups; and the London Missionary Society ship *John Williams V* from Fiji 3 times a year. Nearly every is. has a wireless station and daily contact with Suva, Fiji, and Honiara is maintained through Tarawa. Copra marketing and trade in imported goods, mainly oil, soap, tobacco, and cloth, are almost entirely in the hands of the islanders' own co-operative societies, which are becoming of increasing social importance. The native pop. is Christian and even the smallest is. has its large church dominating the main vil. Primary education at mission schools on each is. achieves general literacy, and the gov. maintains a secondary school on Tarawa. Selected pupils are trained in Fiji as assistant medical practitioners for service in the colony. The colony gov. is under the High Commissioner for the W. Pacific whose H.Q. are at Honiara in the Brit. Solomon Is. Protectorate.

Historically, after a period of chaos and strife following the coming of Europeans to the Pacific (vividly depicted in R. L. Stevenson's *In the South Seas*), the G. and E. groups were brought in 1877 under the jurisdiction of the High Commissioner for the W. Pacific. Subsequently they became a separate entity by the proclamation of a Brit. protectorate over the Gilbert Is. at Abemama, May 1892, and over the Ellice Is. 4 months later. The protectorate was extended to Ocean Is. in 1900. So acceptable did Brit. rule prove to the natives that it was not long before the 'native governments' expressed the wish to be formally incorporated in the Brit. Empire. The G. and E. groups of is. were annexed in 1915 and with Ocean, Fanning, and Washington Is. were constituted into the G. and E. colony in 1916. Christmas Is. was included in 1919 and the Phoenix group in 1937. The pop. of the whole colony is steadily increasing and it was to meet a deteriorating economic situation that the Phoenix Is., previously only intermittently inhabited though claimed by Britain, were formally incorporated in the colony. On them numbers of Gilbertese have been successfully settled. Both the Gilbertese and the Ellice islanders are gifted and artistic people, who find their highest form of self-expression in dancing. See ann. *Colonial Reports, Gilbert and Ellice Islands Colony*, H.M.S.O.

Gilbey, Sir Walter, Bart. (1831-1914), wine merchant, b. Bishop's Stortford, Herts. He volunteered for civilian service in the Crimea, and after his return founded the well-known firm of wine merchants, W. and A. Gilbey. His spare time was devoted to the improvement of the breeds of Eng. horses, on which subject he wrote some standard works. He was president of the Royal Agric. Society in 1895. His writings include *History of the Great Horse or War Horse*, 1888, *Ponies Past and Present*, 1900, *Horse Breeding in England and India*, 1901, *Modern Carriages*, 1904, *Farm Stock One Hundred Years Ago*, 1910, etc., and a vol. on agriculture from

George III to George V, *The Royal Family and Farming*, 1911.

Gilboa (corruption probably of Heb. *Gib'ath habba'al*, hill of Baal), chain of hills between the plain of Esdraelon and the valley of the Jordan, now called Jebel Fukua, scene of the death of King Saul and his 3 sons after the Philistines had defeated them.

Gildas (c. 516-70), Brit. historian. His treatise, *Liber Querulus de Excidio Britanniae*, is the one contemporary source of events in Britain in the first half of the 6th cent.; it is the work of an embittered traditionalist and unreliable in much of its historical information, but it does give important facts about conditions in G.'s own region and own time.

Gilder, Richard Watson (1844-1909), Amer. poet and editor, b. Bordentown, New Jersey. He served as a private during the Civil war. Entering journalism he founded the *Newark Register* with Newton Crane, becoming subsequently assistant editor of *Scribner's Monthly* and editor-in-chief of the *Century Magazine* in 1903. He was one of the founders of the International Copyright League, and took an active interest in all public affairs. His works include *The New Day*, 1875, *Lyrics*, *The Celestial Passion*, *The Great Remembrance*, *Two Worlds* (collected in *Five Books of Songs*, 1894), *Poems and Inscriptions*, 1901, *In the Heights*, 1905, *Collected Poems*, 1908, *Lincoln the Leader*, 1909, and *Grover Cleveland*, 1909.

Gilding, art of covering surfaces with gold by mechanical or chemical means for ornamental purposes. According to Herodotus and Pliny the custom was in use among the anc. Egyptians and also the Romans after the siege of Carthage. The thickness of the gold leaf they employed accounts for the comparatively solid traces extant. The art is seen to perfection in the native processes still pursued in India. G. in modern days is widely employed. The various processes used are as follows: (1) Leaf-gilding, in which pieces of gold leaf are applied to the surfaces by hand and with adhesives. This is the method employed in church and interior decoration, and also by the shop-fitter, picture-frame maker, and the book-binder, though the latter uses heat or pressure, or both, as well. (2) The application of finely divided gold powder instead of leaf is used extensively in the decoration of glass, pottery, and porcelain. (3) Chemical or electrochemical deposition. In this process the plating is effected by depositing the gold from solution by means of low-voltage direct current supplied from a rectifier, motor-generator, or battery. The articles to be gilded are first solvent degreased, and this is followed by alkali cleaning, preferably electrolytic. A thin preliminary film of copper from a cyanide electrolyte is then applied to articles of Britannia metal, tin, zinc, lead, or pewter, prior to immersion in the gold solution. To reduce pitting, a deposit of bright nickel frequently precedes the

The gold solution is prepared by dissolving cyanides of gold and potassium in distilled water. The articles are wired on to copper wires and hung in the hot solution (140° F.), or if of small size are supported in a perforated carrier made from stoneware or other suitable insulating material, and connected to the negative pole of the electric current source at 2-3 amperes per sq. ft. Agitation of the work being gilded is frequently employed. The anode consists of an annealed fine gold plate of area at least equal to that of the work in process. See also GOLD LEAF.

Gilds, see GUILDS.

Gilead ('hard' or 'rugged'), fertile mountainous tract of country traversed by deep ravines, situated in Palestine to the E. of the Jordan. It is bounded on the N. by the R. Yarmak (Hieromax) and on the S. by the Arnon. The tribal land of Gad also seems to have formed part of it. Jephthah and Elijah belonged to G. Josephus sometimes mentions it as divided into small provs. called after the caps. estab. by Gk. colonists in the time of the Seleucidae. The chief tns of G. were Jabesh, Mizpeh, Jazer, Penuel, Succoth, Ramoth-Gilead, Mahanaim, and later Pella and Gerasa. See L. Oliphant, *The Land of Gilead*, 1880.

Giles, Ernest (1839-97), Australian explorer, b. Bristol and educ. at Christ's Hospital, London. He went to Australia at an early age, and in 1872 made an expedition into the interior, which resulted in the discovery of Lake Amadeus. He crossed from Adelaide to Perth about the parallel of 30° S. lat. (1874-6), and recrossed the country between the 24th and 26th parallels, the journey being undertaken on camels. G. proved the interior W. of 132° E. long. to be waste scrub and desert. He pub. *Geographical Travels in Central Australia* (Melbourne), 1874, *The Journal of a Forgotten Expedition* (Adelaide), 1880, and *Australia Twice Traversed*, 1889.

Giles, St (Lat. *Aegidius*) (d. c. 712), probably a Provençal by birth. He was abbot of a monastery on the site of the present city of Saint-Gilles. One of the most popular saints of the Middle Ages, he is still venerated as the patron of beggars, cripples, and blacksmiths. His feast is on 1 Sept.

Giles, or Gilles, A. de Colonne, see COLONNE.

Gillilan, George (1813-78), critic and poet, b. Comrie, Perthshire. Educ. at Glasgow Univ., he became minister of a church in Dundee. His works include *Literary Portraits*, 1850, and a collection of Brit. poets in 48 vols., with introductions and notes. He also wrote *Night*, 1867, a poem in 9 books, and sev. biographies.

Gilgal, name of sev. places mentioned in the O.T.: one at Joshua iv. 19, about 3 m. N. of Jericho; another in Mt Ephraim, N. of a 3rd SE. of Caesarea, known as G. of the Golan; another near Shechem; and a 4th near Jericho, mentioned as a sacred place in the time of Samuel. The

name means a circle of stones (like Stonehenge).

Gilgamesh, old Babylonian epic, the fragmentary remains of which were found inscribed on 12 tablets in the library of Assur-bani-pal at Nineveh. It tells of the adventures of G., who was ruler of Erech, and Enkidu, the wild man who became his friend. It resembles the story of Nimrod. See also ASSYRIA, Literature.

Gilgit, or **Gilgit**, formerly a Brit. Agency (estab. 1889), now part of Pakistan. It is the name both of a tn and dist., which includes Chitral, G., and part of the Indus. The tn is situated nearly 5000 ft above sea-level NW. of Kashmir, and is in a wild mountainous region. During the winter the only communication with G. is by air.

Gill, Arthur Eric Rowton Peter Joseph (1882-1940), sculptor and typographer, b. Brighton, son of Rev. A. T. Gill, was educ. at the Preparatory School, Brighton, and, from 1897, at the Chichester Art School. He was pupil to Douglas Caroe, the architect, 1889-1903, but preferred letter-carving, which led him on the one hand to sculpture and on the other to the designing of type-faces (notably of the fount known as G. Sans-serif). He became an agnostic and later a Socialist. In 1910 he began carving the human figure in stone, and he was encouraged by the approval of Augustus John and by the patronage of Count Kessler. A belief that absolute truth must be ascertainable led him to join the Church of Rome in Feb. 1913, in which year he was commissioned to execute the Stations of the Cross in Westminster Cathedral. After the First World War he carved 'Christ Driving the Moneylenders Out of the Temple' and it was placed as a war memorial at the main entrance to Leeds Univ. Other examples of his work are to be seen at Broadcasting House, at Jesus College, Cambridge, in the Tate Gallery, and in the Victoria and Albert Museum. During the latter part of his life he was a partner in a printing business which specialised in hand-setting. He designed the George VI series of postage stamps and made many wood engravings. Though his exquisite carvings are notable for their simplicity of design and boldness of execution, they are often done in that over-conscious defiance of convention which was first made famous by Epstein. His was the idealistic revolt of the handicraftsman against mass production. G.'s pubs. include *An Essay on Typography*, 1931, *Clothes*, 1931, *Work and Leisure*, 1934, *Money and Morals*, 1934, *Art in a Changing Civilization*, 1934, *Clothing Without Cloth*, 1935, *Necessity of Belief*, 1937, *Work and Property*, 1938, and *Sacred and Secular*, 1940. See ILLUSTRATION. See also W. Shewring, *Letters of Eric Gill*, 1948. Life by E. R. Gill, 1953.

Gill, Sir David (1843-1914), astronomer, b. Aberdeen. He accompanied Lord Lindsay's expedition to the Indian Ocean, and in 1879 became H.M. Astronomer, Royal Observatory, Cape of Good Hope;

and improved observational methods by the use of photography for charting the heavens.

Gilles de Rais, see RERZ.

Gillespie, Thomas (1708-74), minister, b. Clearburn, Midlothian. He was received into the Presbyterian Church and became minister at Carnock, Fiffe. He was deposed by the General Assembly in 1752 for what they called contumacy. Attempts were made to get him reinstated, but he refused to re-enter the Church unless they altered their policy. Finally he formed the Relief Church, which was to relieve worshippers from the discipline of the church courts. This body finally amalgamated with the United Presbyterian Church. G. pub. *An Essay on the Continuation of Immediate Revelation...* in the *Christian Church*, 1771, and *A Treatise on Temptation*, 1774.

Gillflower (from Fr. *Giroflée*), name first given to the Pink, *Dianthus caryophyllus*, and Carnations; later to Stocks (*Matthiola*) and Wallflower (*Cheiranthus*). Chaucer's and Shakespeare's G.s were carnations.

Gillingham: 1. Municipal bor. of Kent, England, situated on the R. Medway. G. has been a settlement since the earliest recorded times; the tn is closely associated with the Royal Navy and H.M. Dockyard, and with the Corps of Royal Engineers, whose H.Q. are within the bor. Pop. 75,450.

2. Tn of Dorset, England, a few m. NW. of Shaftesbury. Pop. 3500.

Gillman, Frederick John (1866-1949), hymn-writer, b. Devizes, Wils. He was a member of the Adult School movement and the Society of Friends, and was a leading member of the committee which compiled, in association with Sir Walford Davies, the *Fellowship Hymnbook*, pub. in 1909.

Gillray, James (1757-1815), caricaturist, b. Chelsea, the son of an ex-soldier and out-pensioner at Chelsea Hospital. Successively a letter-engraver and an actor, he became a caricaturist after studying the works of Hogarth. Before 1790 he had estab. himself as one of the most successful of Eng. caricaturists. His caricatures were fiercely satirical and topical. Before the Fr. Revolution his main butts were George III, the prince of Wales, and various political celebrities in England. Later his ferocity was patriotically aimed against the Fr. and Napoleon, though he spared no one, and one of his most brutal caricatures 'Dido in Despair' was directed against Lady Hamilton. Gross in content, the prints he showed in the shop of his friend, Miss Humphrey, were highly attractive in colour and design. G. became insane in later life. See also under CARICATURE. See life by J. Wright, 1851; also F. D. Klingender, *Hogarth and English Caricature*, 1944.

Gills, or **Branchiae**, respiratory organs of aquatic animals, consist of delicate expansions of skin through which the oxygen is taken into the blood and carbonic acid emitted. Invertebrates generally respire through the skin, and their G. are merely

slight expansions of the body wall; many Echinodermata have their respiratory organs attached to their feet or tentacles, or connected with the thin filaments which float from the head: some of the lower crustaceans, e.g. Phyllopora and Branchiopoda, also breathe through their feet or through respiratory filaments, as in the case of the lobster. *Limulus*, the king-crab, is characterised by a series of broad, flat sacs called 'gill books,' which are borne on the abdominal appendages. The lamellibranchiate molluscs usually carry their G. in the form of ciliated plates on each side of the body. In fishes the G. are generally composed of triangular, membranous folds of skin which are supported by the branchial arch, and lie on each side of the gullet. G. are not found in any order higher than the amphibians and in certain cases, e.g. the frog, they are replaced by lungs in later life.

Gilly, industrial tn in the prov. of Hainaut, Belgium, N.E. of the city of Charleroi. There are important coal-mines here. Chief industries are iron and copper foundries, glass, chain, bolt, and cable works, boiler construction, brewing, and distilling. Pop. 24,800.

Gilman, Daniel Coit (1831-1908), Amer. educationist, b. Norwich, Connecticut. At the Sheffield Scientific School of Yale Univ. he was prof. of political and physical geography. He had an almost revolutionary influence on Amer. educational methods. In 1872 he became president of the univ. of California, and in 1875 he became the first president of the Johns Hopkins Univ. He became the president of the Carnegie Institution of Washington in 1901. Amongst his pubs. were *University Problems in the U.S.*, *James Monroe*, and *The Launching of a University*. See life by F. Franklin, 1910.

Gilman, Harold (1876-1919), painter. Early education, Oxford and Slade School. In Spain he studied Velazquez, and worked out a technique of delicate colour modulations. He became associated with Sickert and his Saturday afternoon receptions at 19 Fitzroy Street, London, of which Frank Rutter has said: 'Sickert was *chef d'école*.' Round him gathered gifted equals and juniors—Augustus John, Wyndham Lewis, and Henry Lamb were frequenters. 'Spencer Gore was his chief of staff, with Harold Gilman as an exceedingly able but sometimes difficult-to-manage aide-de-camp.' One of those influenced by post-impressionist

technique, G. became first president of the London group, and later a chief spirit in the Camden Town group (1911). A fellow member of the Camden Town group, W. Ratcliffe, tells that it was due to the influence of Spencer Gore that G. abandoned thin pigments and worked without a diluting medium. Like Gauguin and other post-impressionists he freely substituted pure colour for degrees of shadow. He painted portraits, domestic interior scenes, and a few landscapes, among his pictures being 'Washing Day,' 'The Yellow Hat,' 'Hampstead Road,' 1914. His last picture, 'Halifax Harbour, Canada' (6 ft by 4 ft), 1918, is at Ottawa. He is important as a Brit. interpreter of modern theory in art. G. lived his art. See F. Rutter, *Art in My Time*, 1923, and C. Ginner, 'The Camden Town Group' in *The Studio*, Nov. 1945.

Gilpin, Bernard (1517-83), clergyman, known usually as the 'Apostle of the North,' b. Kentmere Hall, Westmorland. He was educ. at Queen's College, Oxford. After accepting a vicarage for a short time, he travelled in France, and studied at Louvain and Paris. On his return he was made archdeacon of Durham in 1556. The Marian persecution inclined him to reforming views. His fearlessness and outspokenness gained for him many enemies, but he was ultimately appointed rector of the par. of Houghton-le-Spring. He was offered the bishopric of Carlisle, but preferred to remain in his own par. Here his influence for good was enormous. He did much for education, and built and endowed a grammar school. G. spent much of his time in the wilds of Cumberland and Northumberland, on what were called missionary journeys.

Gilroy, Norman Thomas (1896-). cardinal, archbishop of Sydney, b. Glebe, New South Wales. He studied at St Columba's College, Springwood, New South Wales, and the Urban College of Propaganda, Rome. G. was ordained priest in 1923, appointed archbishop of Sydney, 1940, and created a cardinal, 1946, becoming the first Australian-born cardinal.

Gilyaks (now officially called by their own name *Nivkhi*), Paleo-Asiatic speaking people living near the mouth of the Amur and on Sakhalin Is.; they numbered 4000 in 1926. They are mostly fishermen, now collectivised. G. retained until the 20th cent. a form of group marriage.

Gimson, E., see FURNITURE.

